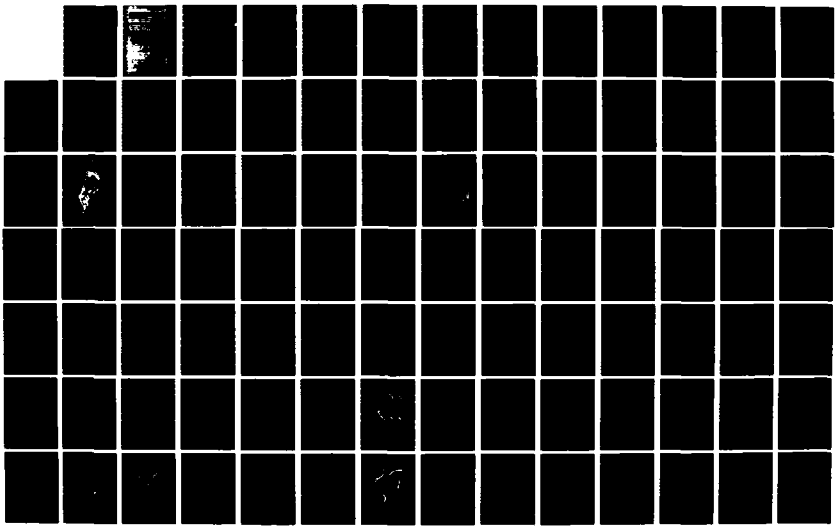
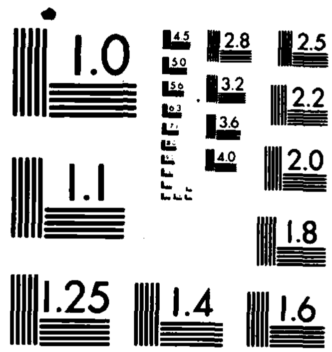
AD-A162 166 ARCHAEOLOGICAL TESTING OF THE BAUMAN SITE (23STG158) 1/3
STE GENEVIEVE COUNTY MISSOURI(U) MISSOURI UNIV-COLUMBIA
AMERICAN ARCHAEOLOGY DIV E E VOIGT ET AL MAY 85 23
UNCLASSIFIED DACW43-83-M-3837 F/G 5/6 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

1

[illegible] DISTRICT CULTURAL RESOURCE [illegible] REPORT NUMBER 23

AD-A162 166

[illegible] Testing of the Bauman Site (23STG158) [illegible] Genevieve County, Missouri

An Archaeological Project Conducted for the United States Army Corps of Engineers, St. Louis District under Purchase Order No. DACW 43-83-M-3837

[illegible] Co-Principal Investigators

MAY 198[illegible]

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 23	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Archaeological Testing of the Bauman Site (23STG-158), Ste. Genevieve County, MO		5. TYPE OF REPORT & PERIOD COVERED Final 5/85
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Eric E. Voigt & Robert L. Reeder		8. CONTRACT OR GRANT NUMBER(s) DACW43-83-M-3837
9. PERFORMING ORGANIZATION NAME AND ADDRESS University of Missouri-Columbia Department of Anthropology American Arcaheology Division		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, St. Louis Room 841 210 N. Tucker Blvd. St. Louis, Missouri 63101		12. REPORT DATE May 1985
		13. NUMBER OF PAGES 186
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) N.A.		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE N.A.

16. DISTRIBUTION STATEMENT (of this Report)

Distribution Statement A: Approved for Public Release: Distribution as unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

N.A.

18. SUPPLEMENTARY NOTES

N.A.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Cultural resource survey, testing, archaeology, Mississippian period.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

To recover, identify and evaluate Mississippian period archaeological remains uncovered during Mississippi River flooding during the winter of 1982-83. Field work included general and controlled surface collections, subsurface testing and limited data recovery of erosion exposed cultural features.

1

ST. LOUIS DISTRICT CULTURAL RESOURCE

MANAGEMENT REPORTS NUMBER 23

Archaeological Testing of the Bauman Site (23STG158)
Ste. Genevieve County, Missouri

An Archaeological Project Conducted for the United States Army Corps of Engineers, St. Louis District under Purchase Order No. DACW 43-83-M-3837

by
Eric E. Voigt
with a contribution by
Robert L. Reeder

Michael J. O'Brien and Robert E. Warren
Co-Principal Investigators

University of Missouri-Columbia
Department of Anthropology
American Archaeology Division

May 1985

ABSTRACT

The Bauman site (23STG158) represents a Mississippian occupation of a cultivated sand ridge in the Mississippi River flood plain, approximately 1 km east of Ste. Genevieve, Missouri. A portion of the site was destroyed when floodwaters of the Mississippi River cut a channel through the site in the winter of 1982-83.

Surface collections, manual excavations, and mechanical stripping were carried out at the site in 1983 and produced large quantities of ceramic and lithic artifacts as well as faunal and floral remains. A wide range of lithic tool and ceramic types is represented in the artifact assemblage. Archaeological testing of the site indicates that intact cultural deposits exist below the plow zone, especially in the northeastern portion of the site. Ceramic analysis and a radiocarbon assay of 530 $\pm$ 50 B. P. indicate the site may contain more than one Mississippian component.

Although testing efforts were neither exhaustive nor complete, the data suggest that the site does contain important, intact cultural deposits. Although the site received severe impact during the 1982-83 floods, we recommend the site for inclusion on the National Register of Historic Places.

CONTENTS

FIGURES

TABLES

PLATES

ACKNOWLEDGMENTS

The author and co-principal investigators, Dr. Michael J. O'Brien and Robert E. Warren, thank Bernard Schramm, Frank Myers, and Stan Drury--all of the Foundation for the Restoration of Ste. Genevieve--for playing a major role in the genesis of this project. These three gentlemen brought the site to the attention of the St. Louis District, and their dedication to the preservation of the prehistoric and cultural heritage of Ste. Genevieve and its environs is directly responsible for the atmosphere of cooperation that existed among property owners, the city government of Ste. Genevieve, the University of Missouri-Columbia, and the St. Louis District. A special note of appreciation must go to Frank Myers, who acted as our liaison with the citizenry, who helped out at the site in many different ways, and who provided wise counsel on public relations on a number of occasions.

Once again, it has been a pleasure to have worked closely with Terry Norris of the St. Louis District. As usual, he provided support and assistance during all phases of the project. Terry provided access to the District's collection of artifacts from the Bauman site for analysis. We also thank George Knight of the St. Louis District for his overall assistance with the project.

The field crew from the University of Missouri-Columbia endured rain, snow, sleet, mud and sub-zero temperatures, and yet maintained a sense of comradery that often is

missing under the best of circumstances. Thus, a special thanks to Robin Brown, Walter Hartwig, Jacqueline Ferguson, and Patrick Trader. Thanks also to Susan Vale for her volunteered assistance; she drafted Figure 3 and drew the profiles in figures 20 and 21.

In addition, several people from Ste. Genevieve assisted in our work at the site, including David Kemp, Ed Uisnoviske, Ted O'Donnell, Dan Khom, Dan Kemper, Andy Berckreman, Pat Huber, Lindell Schmidt, Kyle Schott, and Eric Forhan. Michael and Jerry Capps not only did volunteer work at the site but also loaned artifacts from their collection to the author for analysis. Bill Siebert operated the tractor/blade combination, and Brad Bauman operated the backhoe. The City of Ste. Genevieve provided the road grader and driver for use in stripping the plow zone from a portion of the site.

The project could not have been undertaken without the cooperation of the landowners. Special thanks go to Ed Bauman, on whose property we carried out most of our work, and who was extremely helpful in providing us access to the site and in granting us leeway in our field operations. We also thank the landowners, Emerald Loida and Glenn and James Jokerst for their permission to work on the site. Our deepest appreciation goes to Vern Bauman, who reported the site, and thus is responsible for archaeological work having been carried out there. He provided equipment, loaned material, allowed us access to his artifact collection from the site, and pulled our trucks out of the mud. Conversation with Vern over a

drink or a meal always was a welcome event during the cold days of November and December. Vern was a gracious host, a great help, and a very good friend.

The author thanks Michael J. O'Brien, director of the American Archaeology Division (UMC) and principal investigator of the Bauman Testing Project for his assistance in classifying ceramics from the site. Robert E. Warren, co-principal investigator, directed the fieldwork. Peggy Loy ably administered the project's finances, and Ceri Larson typed the report. Thanks also to Thomas Holland and Brian Deevey for their assistance in preparing the plates.

CHAPTER I: INTRODUCTION

The Bauman site (23STG158), located in eastern Ste. Genevieve County, Missouri, approximately 1 km east of the town of Ste. Genevieve, was impacted severely by recurrent flooding of the Mississippi River during the winter of 1982-83 and the resultant washout of a levee surrounding one of the town's sewage lagoons (Figure 1). The U.S. Army Corps of Engineers, St. Louis District, proposed that the site area affected by the flooding be filled with dirt during the repair of the Mississippi River levee around the Common Field of Ste. Genevieve. In compliance with federal laws and regulations established to preserve archaeological and other cultural resources, the St. Louis District made a phase I reconnaissance and surface collection of materials from the site in May 1983. The possibility of further damage to the site by agricultural activities, levee repair work, and flooding by the Mississippi River led the District to recommend further archaeological work at the site.

In October 1983, the University of Missouri-Columbia initiated a phase II testing of the site. Fieldwork began in October and continued until the third week in December, when inclement weather forced field operations to cease.

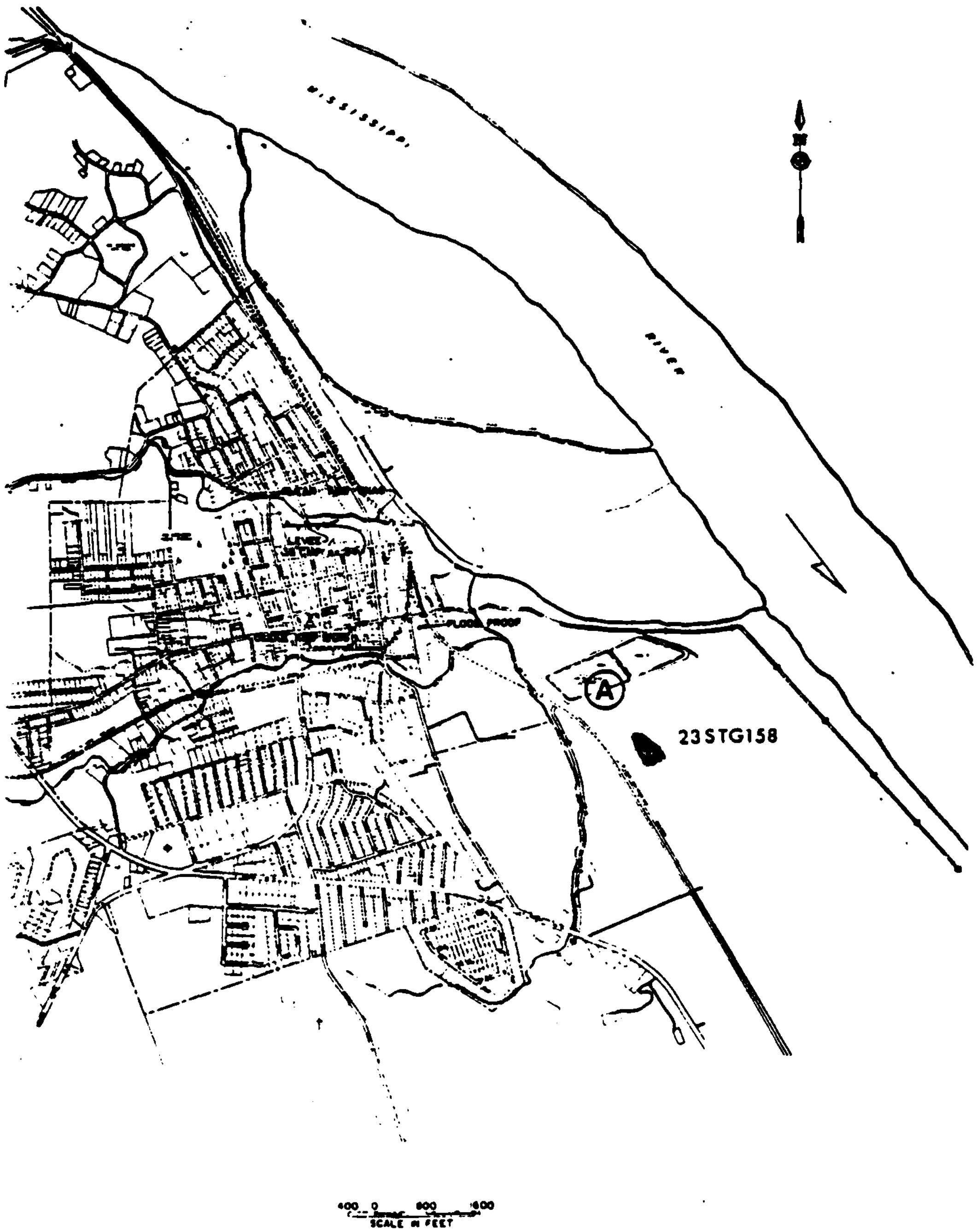


Figure 1. Map of Ste. Genevieve, Missouri, showing area of break in lagoon dike (A) and location of the Bauman site (23STG158) (after USA-COE 1984).

This chapter reviews previous archaeological investigations carried out in the Ste. Genevieve locality, provides an introduction to the different kinds of research strategies and field techniques employed, and summarizes the artifact assemblages recovered from earlier endeavors. The remainder of the report contains chapters on environmental setting, fieldwork and analytical techniques employed, the artifact assemblages recovered from the Bauman site, the paleoethnobotany, the zooarchaeology, the site's role in Mississippian subsistence settlement systems, and an evaluation of the site in terms of criteria for eligibility to the National Register of Historic Places--including recommendations relative to further archaeological work.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

The testing project at the Bauman site is the latest in a series of archaeological investigations carried out in the Ste. Genevieve locality. Much of this work has centered on sites near the salt springs on Saline Creek (e.g., Keslin 1964) or in the Common Field (e.g., O'Brien 1981; Voigt and O'Brien 1982); other work has consisted of relatively large areal or countywide surveys (e.g., Adams *et al*. 1941; Bushnell 1914). Recently, attention has focused on multidisciplinary research into the early Euro-American history, demography, architecture, social organization, and archaeology of the town of Ste. Genevieve.

An intensive pedestrian survey of the Mississippi River flood plain in the Ste. Genevieve locality (University of Missouri-St. Louis) also is planned. Although sites from different prehistoric cultural periods (Archaic through Mississippian) have been located, described, and excavated, Mississippian period sites have been the objects of intensive study by archaeologists. We summarize below some of the important investigations carried out over the years, especially those that bear directly on our work at the Bauman site.

The Saline Creek Locality

Although Bushnell (1914) did preliminary work in the area of Saline Creek near the turn of the century, it was Keslin (1964) who carried out the first systematic excavation of archaeological sites near Ste. Genevieve. He excavated six sites with Mississippian period components, four of which (23STG5, 23STG7, 23STG112, and 23STG113) are open-station sites and two (23STG75 and 23STG300) are cemeteries (Figure 2).

Mississippian-period ceramic assemblages from the sites contain three well-represented types--Fabric Impressed, Mississippian Plain, and Cahokia Cordmarked-- and several minor types--Powell Plain, Ramey Incised, and Wells Incised. Chipped-stone tool inventories include typical Mississippian notched and triangular projectile points. Other Mississippian

artifacts recovered include basalt groundstone tools, animal bone, worked-shell beads and pendants, bifaces, debitage, and pipe fragments.

Results of Keslin's (1964) analyses of the artifact assemblages and site structure indicate that all six sites are associated with Middle Mississippian groups that probably were involved in the processing and distribution of salt obtained from the saline springs along Saline Creek. In addition, Keslin (1964) also believes that the occupations represent an enclave of Middle Mississippian peoples living in the midst of a local population sharing in a continuing Late Woodland cultural tradtion.

The Common Field Site
(23STG100)

The Common Field site has been the object of intense interest, both by amateur and professional archaeologists, for nearly a century. The site is located on a low-lying ridge adjacent to a former channel of the Mississippi River, approximately 10 km south of Ste. Genevieve (Figure 2). The site is a palisaded Mississippian community of approximately 15 ha. The dominant topographic features of the site are seven mounds arranged around a central plaza (O'Brien et al. 1982).

Recent investigations at the site were carried out after a levee surrounding the Common Field broke in two places during the spring floods of 1979. Floodwaters

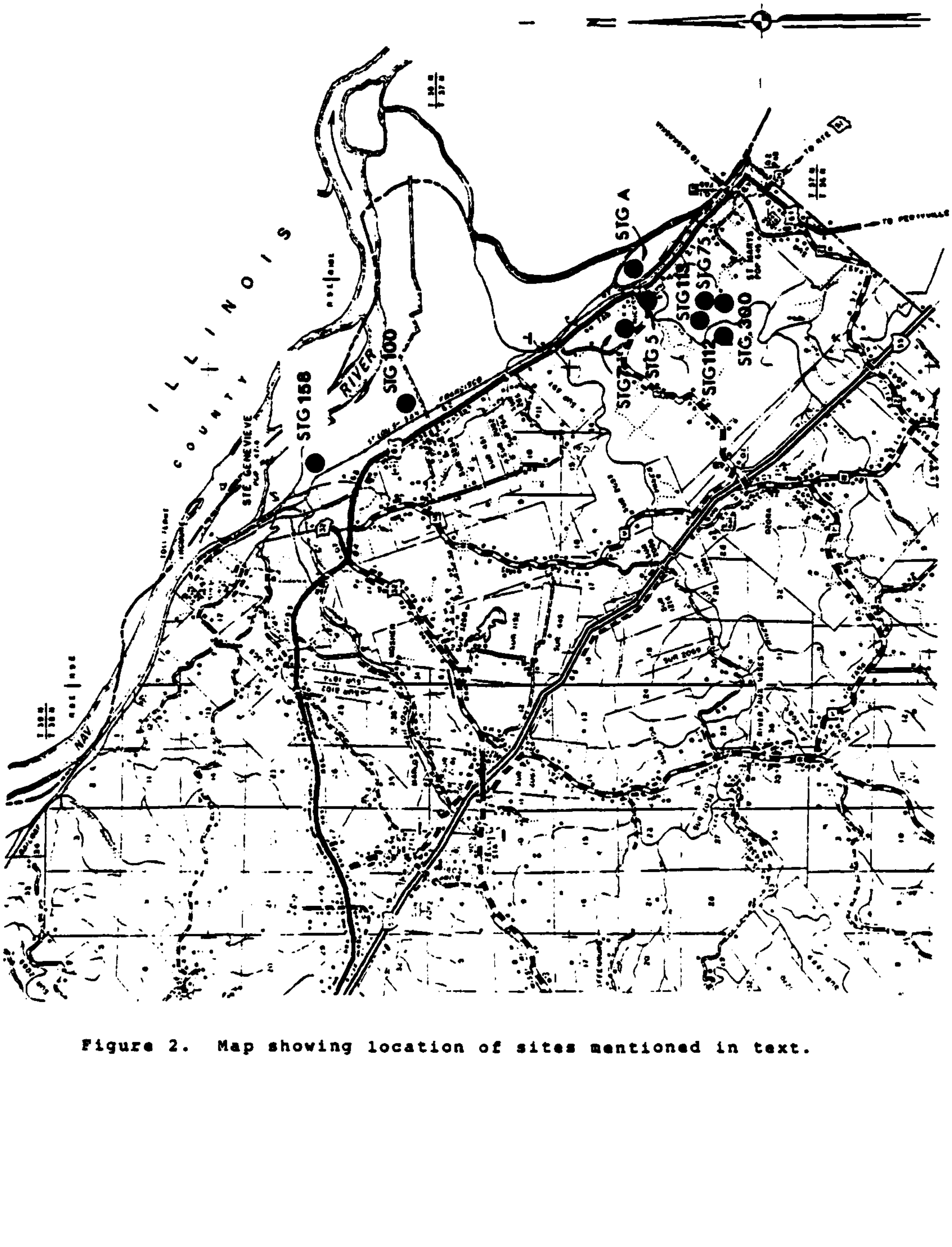


Figure 2. Map showing location of sites mentioned in text.

removed 30-50 cm of topsoil and exposed in situ human burials, burned houses, and cache pits, as well as animal bone, shell, and lithic and ceramic artifacts. An area of $5744 m^2$ was collected in 2-x-2-m units (O'Brien et al. 1982: Figure 2).

The artifact assemblage contains examples of the following ceramic types: Powell Plain, Mississippi Plain, Cahokia Cordmarked, Fabric Impressed, Mississippi Red-filmed, Wells Incised, and painted wares. Lithic artifacts include basalt groundstone tools, Mississippian side-notched and Cahokia triangular projectile points, sandstone abraders and metate fragments, and debitage.

Analysis of the faunal remains documents the presence of elements of deer, rabbit, squirrel, muskrat, dog, turkey, raptors, and waterfowl. Remains of fish, amphibians, and freshwater molluscs also have been identified. Macrobotanical remains were recovered during the surface collection and from samples taken from structures and exposed pits. Carbonized plant remains include specimens of common bean (Phaseolus vulgaris), wild bean (Strophostyles spp.), black walnut (Juglans nigra), hickory nut (Carya spp.), maize (Zea mays), knotweed (Polygonum erectum), and morning glory (Convolvulaceae).

While the data recovered at the site have not been analyzed thoroughly, it appears the site probably was occupied between A.D. 1000-1350 (O'Brien 1981). We can infer from analyses that the Common Field site fits Fowler's (1978:468) definition of a second-line community.

Fowler (1978:472) suggests such sites in the American Bottom may have controlled access to the region or served as major "transshipment communities for goods." Interestingly, a slightly smaller second-line community once existed to the north of Common Field, 3.5 km southwest of Prairie du Rocher, and another (23STGA) once existed near the mouth of Saline Creek (Bushnell 1914) (Figure 2). To understand and demonstrate the kinds of contacts between the Common Field site and these other sites, as well as between Common Field and Cahokia, requires further analysis. However, it appears that (a) aquatic, arboreal, and terrestrial fauna were exploited, (b) cultivation of maize and native cultigens was carried out at or near the site, (c) raw materials (e.g., granite and basalt) were processed into tools at the site, and (d) the ceramic assemblage indicates some kind of contact with Cahokia, and possibly with groups in the lower Mississippi River valley.

SUMMARY

This introduction has sketched a background against which we can begin to understand the character of the Bauman site. In developing a structured framework for analyzing material from the site, and for interpreting the archaeological record, we have outlined certain research problems, including: (a) the nature of the environment at the time the site was occupied; (b) the strategies of resource procurement; (c) the relationship between

the site and the Common Field and/or other Middle Mississippian sites (especially Cahokia); and (d) the function of the site in the Mississippian subsistence settlement systems. These issues are addressed in the following chapters.

CHAPTER 2: ENVIRONMENTAL SETTING

This chapter addresses the modern and historical environments of the site locality, focusing on Holocene climatic change as it related to the settlement-subsistence systems of prehistoric groups that occuppied the Bauman site. In any ecological study it is necessary to discuss questions concerning environmental change in terms of a dynamic, areal context. Thus, we examine man-land relationships in a rather broad spatial/temporal range. Rather than modeling only the recent environment in the immediate vicinity of the Bauman site, we defined a study area of approximately 12 km^2 around the site (Figure 3) and developed a model of Holocene environments in the Bauman site vicinity.

PHYSIOGRAPHIC SETTING

The study area is bounded on the east by the Mississippi River and on the west by the rugged uplands in the central portion of Ste. Genevieve County. Thus, part of the study area lies in the Ozark Highland, while a portion lies in the upper Mississippi River alluvial valley (Figure 4). The recent native vegetation of the study area is best characterized as temperate deciduous forest. Biotic communities include bottomland forest, wetlands, and grasslands, as well as upland oak-hickory forest interspersed with

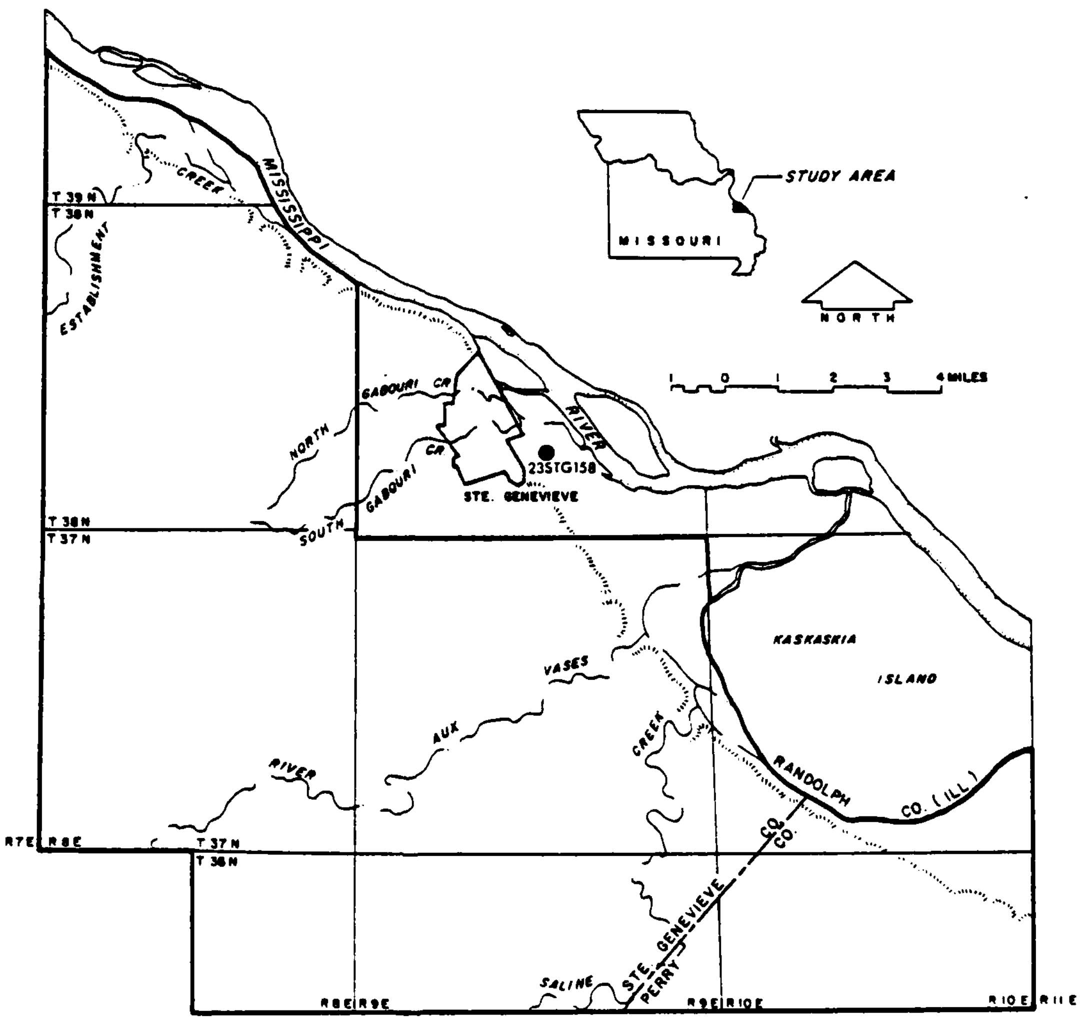


Figure 3. Map of the Ste. Genevieve locality, the study area, and location of the Bauman site.

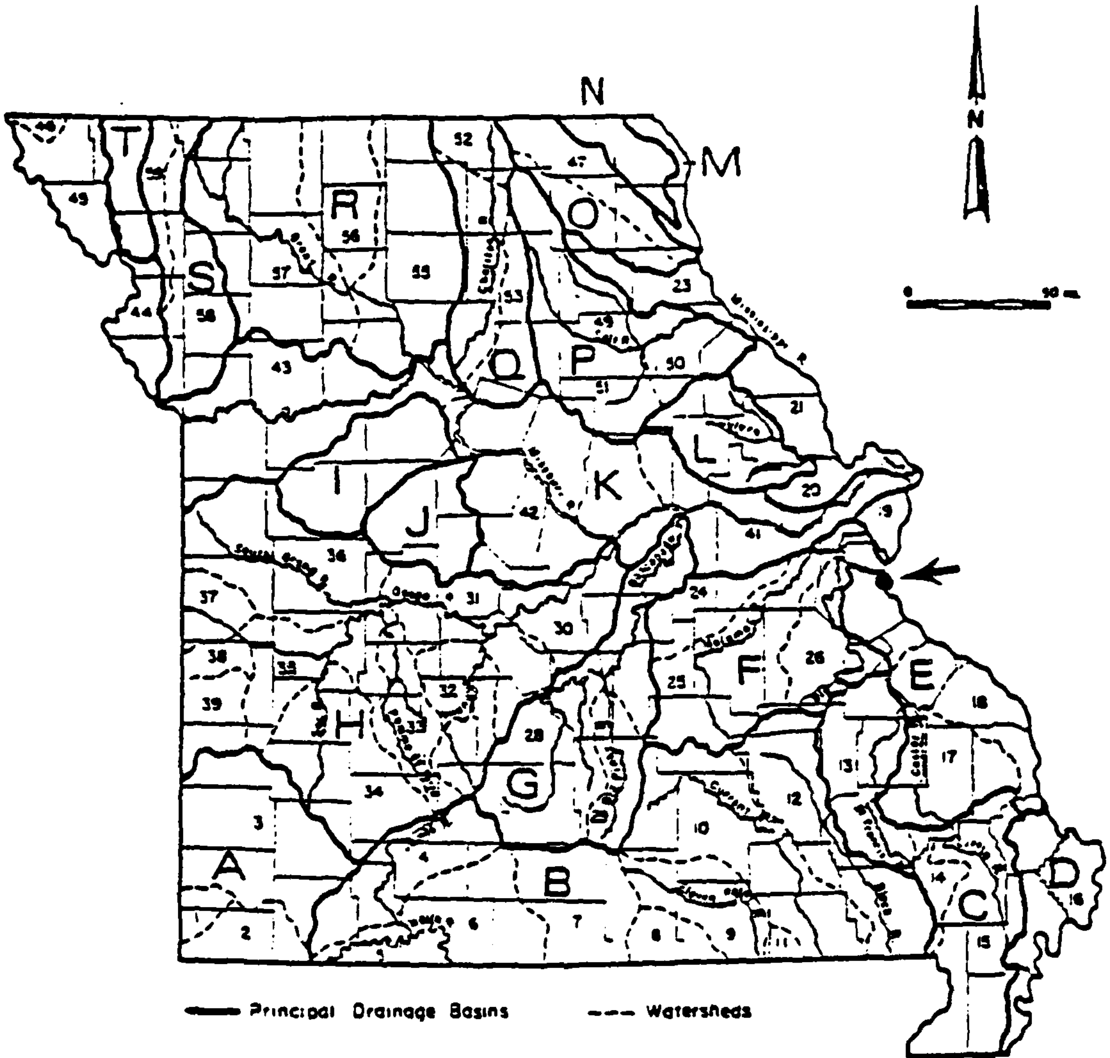
cedar glades and grassy areas.

The climate is temperate and continental, with seasonal extremes in precipitation and temperature. During the winter months polar continental air masses dominate weather patterns, bringing much cooler temperatures with intervening surges of warm tropical maritime air. The early historical-period climate probably was similar, except that temperatures were cooler and precipitation may have been greater (see Bernabo 1981). Thus, we expect that forest density may have been slightly greater than at present (see Wood 1976).

The hydrology of the study area is dominated by the Mississippi River and four tributary streams: Establishment Creek, Gabouri Creek, River Aux Vases, and Saline Creek (Figure 3). Those streams have steep gradients where they have eroded and cut through bedrock of sandstone and shale. The streams also are characterized by entrenched valleys and narrow flood plains. Other hydrolic features include sloghs, oxbow lakes, backswamps, and ponds; in many upland areas drainage is through underground streams by way of sinkholes. Both salt and freshwater springs are found within the study area.

LANDSCAPE

Historical maps indicate that while the upland landscape has remained relatively stable over the centuries, the Mississippi River valley landscape has experienced drastic



- A. Arkansas
  - 1. Lost Creek
  - 2. Elk
  - 3. Spring
- B. White
  - 4. James
  - 5. Table Rock
  - 6. White
  - 7. North Fork
  - 8. Spring
  - 9. Eleven Point
  - 10. Current
  - 11. Fourche Creek
  - 12. Black
- C. St. Francis
  - 13. Upper St. Francis
  - 14. Lower St. Francis
  - 15. Little River
- D. Lower Mississippi
  - 16. Lower Mississippi
- E. Upper Mississippi
  - 17. Whitewater/Castor
  - 18. Mississippi 1
  - 19. Mississippi 2
  - 20. Mississippi 3
  - 21. Mississippi 4
  - 22. Mississippi 5
  - 23. North River
- F. Meramec
  - 24. Bourbeuse
  - 25. Meramec
  - 26. Big
- G. Gasconade
  - 27. Lower Gasconade
  - 28. Upper Gasconade
  - 29. Big Piney
- H. Osage
  - 30. Lower Osage
  - 31. Lake of the Ozarks
  - 32. Niangua
  - 33. Pomme de Terre
  - 34. Sac
  - 35. Upper Osage
  - 36. South Grand
  - 37. Marais des Cygnes
  - 38. Little Osage
  - 39. Marmaton
- I. Blackwater
- J. Lamine
- K. Missouri
  - 41. Missouri 1
  - 42. Missouri 2
  - 43. Missouri 3
  - 44. Missouri 4
  - 45. Missouri 5
  - 46. Nishnabotna
- L. Cuivre
- M. Des Moines
- N. Wyaconda/Fox
- O. Fabius
  - 47. North Fabius
  - 48. South Fabius
- P. Salt
  - 49. North Fork
  - 50. Salt 1
  - 51. Salt 2
- Q. Chariton
  - 52. Upper Chariton
  - 53. Lower Chariton
  - 54. Middle/East Fork
- R. Grand
  - 55. Grand 1
  - 56. Thompson
  - 57. Grand 2
- S. Platte
  - 58. Platte
  - 59. One Hundred & Two
- T. Nodaway

Figure 4. Location of the project within the Missouri watershed system.

reshaping brought about by a series of channel changes and abandonments. During the eighteenth century the Mississippi River was farther west than its present position, and it joined with the Kaskaskia River south of Kaskaskia Island (Figure 5). The Mississippi River probably followed this course in the 1750s, a time of major settlement by the French in the flood plain around Ste. Genevieve. With the flood of 1785, the course of the Mississippi River changed again, shifting toward the western side of the valley. This was the course mapped by GLO surveyors in the early nineteenth century.

During the second half of the nineteenth century, the Mississippi River channel migrated east, forming a new juncture with the Kaskaskia River (Figure 5) and creating Kaskaskia Island. Finally, in 1881 a major flood caused the Mississippi channel to migrate still farther east and to capture the Kaskaskia River channel (Figure 5). The relief of the modern flood plain is composed of 10 distinct landforms and features: (1) former meander belts, (2) oxbow lakes, (3) point bars, (4) sloughs, (5) natural levees, (6) backswamps, (7) meander scrolls, (8) river channels, (9) sand ridges, and (10) the alluvial plain.

Change in the relief of the upland portions of the study area has been accomplished mainly through mass wastage and other erosional processes. Therefore, the upland area is not as dynamic as the Mississippi River bottom.

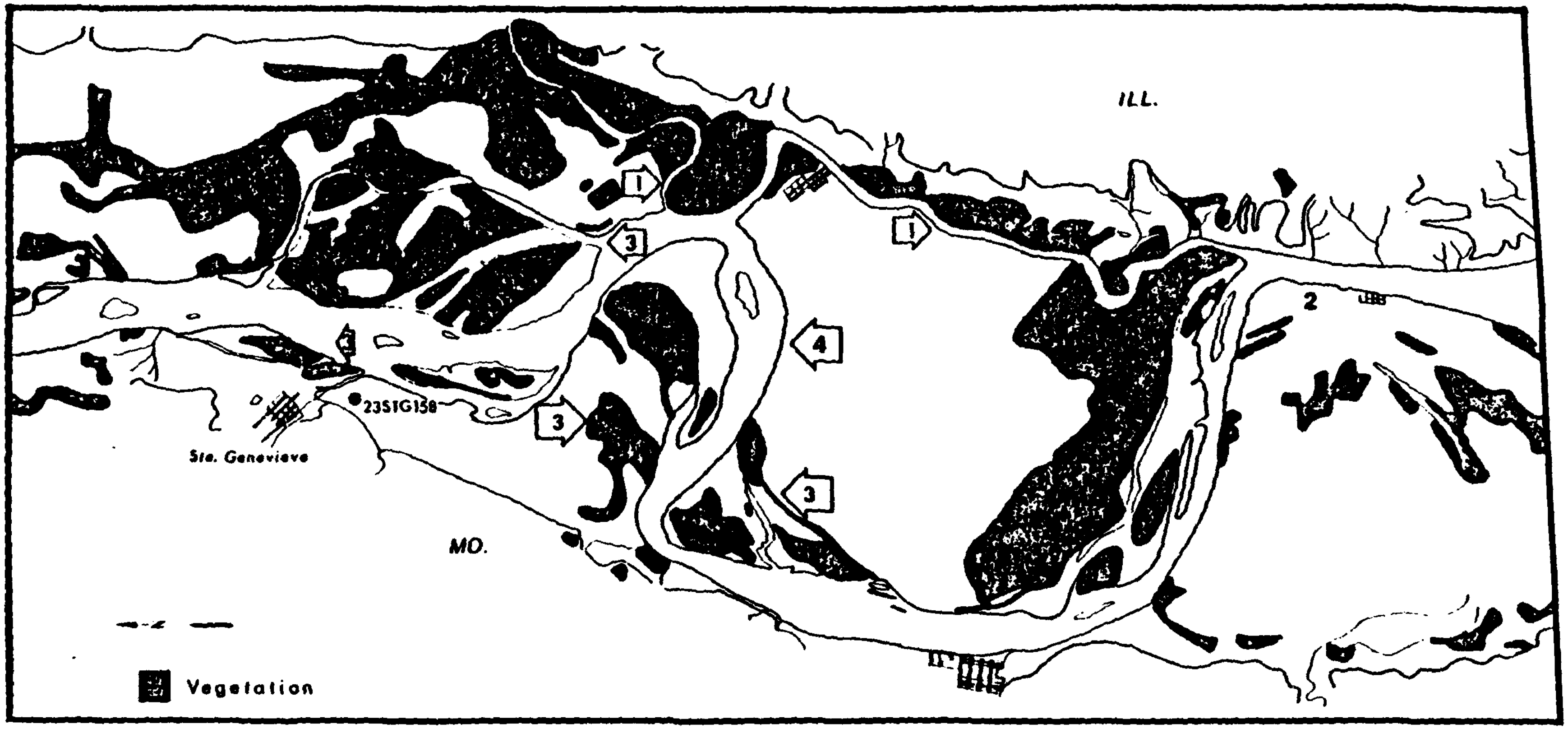


Figure 5. Map of the Mississippi River channels. (1=18th century channel of the Kaskaskia River; 2=former juncture of the Mississippi and Kaskaskia rivers; 3=the 18th century channel of the Mississippi River; 4=the 19th century channel of the Mississippi River).

Water-deposited sediments occur along the margins of intermittent and perennial streams and along the bottoms of the four major tributary streams of the Mississippi River. The slopes and crests of the upland divides have been shaped by the weathering of exposed bedrock and the erosion of soils. The other dynamic area of the uplands is at the footslope of the hills, where colluvium has accumulated as a result of erosion. Modern agricultural practices have accelerated the headward erosion of streams and gullies, increased sheet erosion in upland and bottomland areas, and increased the sediment load of many streams in the study area.

To facilitate our modeling of the early historical-period environment of the Ste. Genevieve locality, we divided the study area into five drainage classes following criteria outlined by Warren and O'Brien (1981) (Table 1). Drainage classes are precisely defined slope-position categories, and each class exhibits certain characteristics unique to that class and which crosscut several different environmental dimensions such as landforms, soils, and vegetation.

HISTORICAL-PERIOD FLORAL SETTING

In this section we use three data sets to develop a model of the early historical flora in the vicinity of Ste. Genevieve. Since soils often reflect the effects of vegetation on their formation and developmental processes,

Table 1. Drainage Class Perimeters and Intervals as Applied to the Study Area

Drainage class	Topographic position	Class interval[a]	Class perimeter[b]
1	flood plain	20	360-380
2	lower slope/ high bottom	40	380-420
3	middle slope	145	420-565
4	upper slope	156	565-711
5	level upland	155	711-861

[a] In feet.

[b] Class perimeters are in feet; formulas are as follows: drainage class (DC)3 = 1/3 (maximum upland elevation MUE - 60 feet above mean major stream level MMStL) + 50 feet + AMMStL; DC4 = 2/3 (MUE - 60 feet AMMStL) + 60 feet + MMStL; DC5 = MUE.

our first data set consists of information derived from USDA-SCS soil interpretation sheets. Our second data set consists of information culled from historical accounts--information that provides us with an insight into the diversity and distribution of plant species during the latter part of the eighteenth and early part of the nineteenth centuries. Our third data set consists of GLO survey field notes for the study area. Incorporated into this data set are the results of recent ecological studies carried out in the central Mississippi River valley. Each data set complements the other, and together they offer a rather complete picture of the early historical environment in the Bauman site locality.

Method and Technique

We do not intend to present a vegetation map of the Bauman site locality. Rather, we intend to model the probable tendencies of plant community composition and distribution. Importantly, there are several assumptions that are the basis of the methods and techniques employed in this study. Chief of these is the assumption that plants are distributed nonrandomly across the landscape and that these coordinate patterns of relative abundance exist as mosaics or as zones along environmental gradients (Whittaker 1975). Another assumption is that the GLO and historical data accurately reflect the nature of plant density and distribution at the time of the early historical

settlement of the Ste. Genevieve locality and that they can serve as a model of prehistoric environments. This does not mean that we expect taxa to have been located in the same place through time, but rather that the character of the biomes, e.g., species composition, diversity, and density, did not change much from the late eighteenth century to the first two decades of the nineteenth century. While our study area includes a number of private land surveys, we did not use the township that includes Ste. Genevieve (T38N, R9E) because we felt that significant alteration of the forest overstory occurred soon after Euro-American settlement of that particular area. We base this premise on the fact that the Common Field area was under cultivation at the time of the GLO surveys and because early historical narratives mention that the inhabitants of Ste. Genevieve denuded the hills of timber to the north and west of the town (Brackenridge 1814).

Soils-Related Data

Soils are the end product of interactions among environmental factors and soil-development processes. Parent material, relief, climate, the biosphere, energy of the environment, and time are major factors influencing both the deposition of sediments and the development of soils in those sediments.

Vegetation is one of the most important factors in soil formation and development. A high degree of correlation between groups of plant species and biomes with specific

soil orders and suborders is one of the basic tenets of soil classification systems (Soil Survey Staff 1975). Crocker (1952:148) states that vegetation is the major determinant in soil development. This close bond between soils and native vegetation under which they develop has been examined in detail in both the ecological and soils literature (e.g., Loomis and McComb 1944; Robertson *et al*. 1978). Previous work in the study area (Voigt and O'Brien 1982) focused on the use of soils-related data in modeling past environments in the Bauman site vicinity. Soils data were used to date certain landforms in the study area, to determine the character of native vegetation under which those soils formed, and to provide an approximate boundary of certain ecological groups and/or plant commmunities.

Following the work by Voigt and O'Brien (1982), we identify six bottomland communities: tall-grass prairies, wet prairie, mixed grassland/forest, riparian forest, marsh, and deciduous forest (Figure 6). Tall-grass prairie is restricted to the tops of elevated sand ridges (e.g., the Bauman site). Wet prairie occurs on most of the level and/or undulating surfaces of the flood plain. Mixed grassland/forest communities (usually consisting of grasses, forbs, and willows) occur along sloughs and newly deposited sediments. Riparian forest grows along the tops of the natural levees along recent channels of the Mississippi River. Marshlands are restricted to slackwater areas. Finally, deciduous forest occurs along the base of the

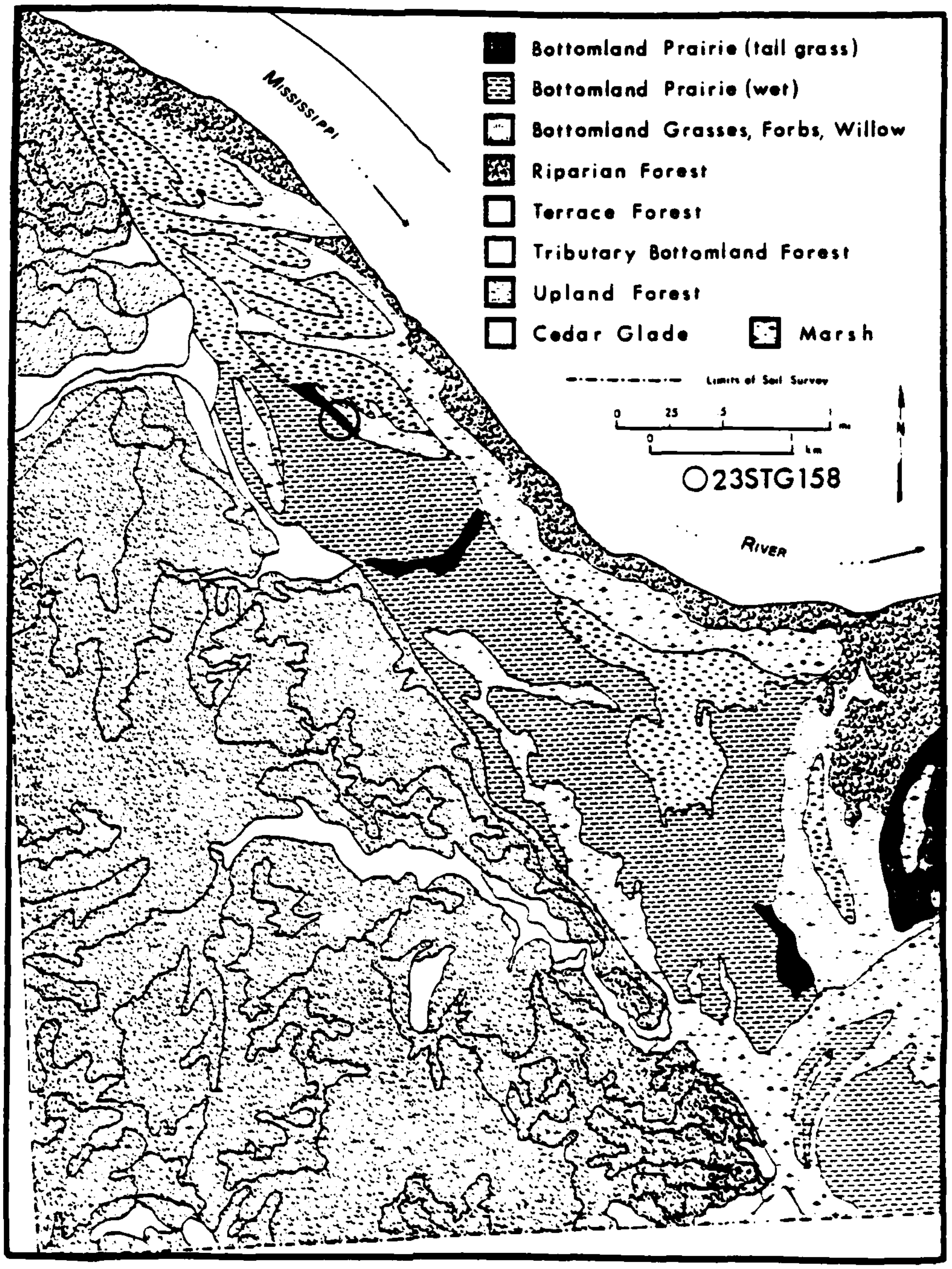


Figure 6. Model of recent floral communities based on soil series interpretation sheets and mapped on Ste. Genevieve soil survey field map (SCS n.d.a.) (after Voigt and O'Brien 1982).

bluffs that border the Mississippi River valley and along tributary stream courses.

Other data indicate that these communities probably were present in bottomland contexts in prehistory and at the time of Euro-American settlement of the Ste. Genevieve locality. However, this is not to say that they occupied the <u>same</u> locations, but only that such communities existed in similar habitats to those that occur today.

In upland areas there are four kinds of communities indicated by our analysis of the soils data: upland deciduous forest, sparse slope forest, cedar glades, and mesic deciduous forest. There is no evidence for large-scale upland prairie in the study area.

The upland deciduous forest occupies the divides and level upland areas. The sparse slope forest grows in thin soils on the moderate and steep slopes in the rugged areas of Ste. Genevieve County. Cedar glades occur where erosion has removed much of the soil and left exposed outcrops of bedrock. Finally, mesic deciduous forest occupies the flood plains and terraces along the four tributary streams.

Narrative Accounts

Table 2 presents a summary of accounts of the historical-period vegetation of the Ste. Genevieve locality. Most descriptions are of the Mississippi River flood plain, and they resemble closely the results of recent ecological

Table 2. Synopsis of Historical Descriptions of Vegetation in the Central Mississippi Valley (After Voigt and O'Brien 1982)

Date	Description	Source
1770	muddy lands have cane, long grass and weeds	Pittman 1770
1812	timbered hillslopes denuded by villagers from Ste. Genevieve	Brackenridge 1814
1812	river margins are forested, then prairie runs from edge of forest to bluffline	Stoddard 1812
1824	bottoms are open woodlands with willows along shores	n.a. 1824
1828	wet and dry alluvial prairies	Flint 1828
1836	forested bottomland; settlers altering vegetation	Hall 1836
1850s	islands are forested - new islands have cottonwood and willow and established islands have oak, walnut, maple, and elm; American Bottom has forested river margins with marshes and prairies from forest edge to bluffline	Lewis (in (Heilborn 1967)
1881	hardwood taxa noted in flood plain include oaks, hackberry, hickories, cottonwood, sycamore, and willow	MRC[a] 1881
1893	bottomland communities include timber, marsh and grasslands	MRC 1893

[a] Mississippi River Commission channel charts.

studies. There is one important set of historical documents that was <u>not</u> used in our study--the Soulard surveys. We began using the Soulard surveys as if they were a quantifiable data set. However, after translating and mapping almost all the surveys available for the District of Ste. Genevieve, we decided not to use the data. There were three reasons for this decision. First, the data points (i.e., trees) are not an appropriate sample against which to apply statistical techniques because the selection of trees is biased. Trees were selected for mapping because they either were at the points of private surveys or they were points at which two surveys intersected. Second, we took a sample of 23 Soulard surveys to determine the number of points mapped and the number of trees described (Table 3). As the results show, less than one-half of the corner-points were marked by an identifiable tree. Third, not only were trees selected in a nonrandom manner, but they were not located so that we could model the diversity and abundance of taxa across the landscape and along an environmental gradient. However, the surveys did indicate that many of the same taxa mentioned in other historical accounts and in the GLO survey notes were present at the time of the Soulard surveys. Taxa included white oak, black oak, red oak, walnut, maple, hickory, sycamore, beech, and cottonwood.

Table 3. List of Soulard Surveys Used to Determine the Viability of Soulard Sample Using Corner-Point Data

Name of landowner	Number of corner points	Number of corner points with an identifiable taxon
M. de lassus de Luziere	4	3
William James	4	2
M. Pascal Detchmendy	5	2
Gabriel Cerre	4	1
Francois Wideman	4	1
John Doulin	6	2
Antoine Cerre	4	0
Johnathan Kindal	5	2
Thomas Alley	4	2
William Patterson	6	4
Andrew Baker	3	1
William Alley	6	3
Barn Burn	4	1
Joseph Baice	4	3
Marie Valle	5	1
Francois Valle	4	2
Guillame Burn	4	2
Jacques Burn	6	4
Francois and Baptiste Moreau	6	4
Israel Dodge	4	4
Joseph Finewick	4	3
Baptiste Valle	4	0
Francois Clark	4	3
TOTAL	104	50

General Land Office Survey Data

Examples of the application of quantitative techniques to GLO-derived data abound in the ecological literature (e.g., Leitner and Jackson 1981). Although there are problems in using GLO data (Bourdo 1956; Wood 1976), the data often (a) can be viewed as representative of a population (Warren 1976) and (b) can provide accurate indicators of community structure and species diversity and distribution. Since species populations cluster along environmental gradients, aggregates are distinguished as groups of species that show coordinate patterns of relative abundance across the landscape. These _ecological groups_ (Whittaker 1975) exhibit quantifiable trends in modality, species richness, and species diversity.

Quantitative analysis of GLO-derived data from the study area required that several statistical and phytosociological techniques be used to determine the structure and composition of early historical-period forest in the study area. Our data base consists of 414 trees-nearest posts; all are section-corner or quarter-section corner trees. Twenty-three taxa were recorded by surveyors in the study area (Table 4). Understory taxa mentioned include hazel (_Corylus americana_), spicebush (_Lindera benzoin_), and huckleberry bush (_Gaylussacia baccata_). Other overstory taxa mentioned in the field notes, but which are not represented in the bearing tree sample, include overcup oak (_Quercus lyrata_),

Table 4. Number, Relative Density (RD), and Species Density per Hectare (SDH) for Each Taxon by Drainage Class

Taxa	Drainage Class																		
	Streamside [a]			1			2			3			4			5			
	n	RD	SDH	n	RD	SDH	n	RD	SDH	n	RD	SDH	n	RD	SDH	n	RD	SDH	TOTAL
White Oak (Quercus cf. alba)	11	.20	10.2	4	.11	3.13	12	.40	13.28	87	.52	19.86	96	.60	26.29	23	.45	37.71	233
Black Oak (Quercus cf. velutina)	4	.07	3.57	3	.08	2.27	9	.30	9.96	60	.36	13.75	47	.29	12.71	21	.41	34.36	144
Oak (Quercus spp.)	0	-	-	1	.03	[b]	0	-	-	0	-	-	1	+	*	0	-	-	2
Hackberry (Celtis occidentialis)	1	.02	1.02	9	.25	7.12	0	-	-	0	-	-	0	-	-	0	-	-	10
Ash (Fraxinus spp.)	2	.04	2.04	2	.06	1.70	0	-	-	1	+[c]	*	1	+	*	0	-	-	6
Hickory (Carya spp.)	2	.04	2.04	2	.06	1.70	1	.03	1.21	11	.07	2.67	15	.09	3.94	4	.08	6.70	35
Elm (Ulmus spp.)	6	.11	5.61	2	.06	1.70	1	.03	1.21	1	+	*	0	-	-	0	-	-	10
Pine (Pinus spp.)	0	-	-	0	-	-	0	-	-	0	-	-	1	+	*	1	.02	1.68	2
Buckeye (Aesculus cf. glabra)	0	-	-	0	-	-	0	-	-	1	+	*	0	-	-	0	-	-	1
Walnut (Juglans cf. nigra)	2	.04	2.04	3	.08	2.27	2	.07	2.11	1	+	*	0	-	-	0	-	-	8
Maple (Acer spp.)	5	.09	4.59	0	-	-	1	.03	1.21	0	-	-	0	-	-	1	.02	1.68	7
Mulberry (Morus rubra)	0	-	-	3	.08	2.27	1	.03	1.21	1	+	*	0	-	-	0	-	-	5
Sycamore (Platanus occidentalis)	11	.20	10.20	1	.03	*	0	-	-	0	-	-	0	-	-	0	-	-	12
Black gum (Nyssa sylvatica)	0	-	-	0	-	-	1	.03	1.21	2	.01	.38	0	-	-	1	.02	1.68	4
Sassafrass(Sassafrass albidum)	1	.02	1.02	0	-	-	0	-	-	1	+	*	0	-	-	0	-	-	2
Plum (Prunus serotiana)	0	-	-	0	-	-	2	.07	2.11	0	-	-	0	-	-	0	-	-	2
Box Elder (Acer negundo)	0	-	-	3	.08	2.27	0	-	-	0	-	-	0	-	-	0	-	-	3
Cottonwood (Populus deltoides)	4	.07	3.57	1	.03	*	0	-	-	0	-	-	0	-	-	0	-	-	5
Sugar Maple (Acer saccharum)	2	.04	2.04	0	-	-	0	-	-	1	+	*	0	-	-	0	-	-	3
Honey Locust (Gleditsia triacanthos)	0	-	-	1	.03	*	0	-	-	0	-	-	0	-	-	0	-	-	1
Lynn (Tilia americana)	1	.02	1.02	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	1
Butternut (Juglans cinerea)	1	.02	1.02	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	1
Red Haw (Viburnum spp.)	1	.02	1.02	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	1

[a] Includes all streamside trees from GLO section, township, and range lines, as well as private survey corners along Establishment, Gabouri, and Saline creeks, and River Aux Vases;

[b] * = value less than one stem per hectare;

[c] + = value less than .01.

paw-paw (Asimina triloba), and dogwood (Cornus spp.). In addition, our sample includes 84 streamside trees. Herbaceous undergrowth mentioned in the survey notes include grape, blackberry, oak bush, scrub oak, red root, grass, and sedge grass.

We first calculted the relative density (RD) for each species using the following formula:

$$RD=n_i/N$$

where n_i is the number of individuals of a species and N is the total measure of the proportional importance of each species in each drainage class. Modes (i.e., peaks in relative density) are exhibited by each taxon (Table 4). Ecological groups were established by drainage class.

Once the ecological groups were established, the character of the forest in the study area was ascertained. The class density per hectare (CDH), i.e., the tree density of each drainage class, and the species density per hectare (SDH) were calculated (tables 4 and 5). Tree density was calculated using the "closest individual" technique of Cottam and Curtis (1956). Briefly, distances to trees-nearest-posts were (a) added to the radius of each nearest bearing tree, (b) stratified by drainage class, (c) averaged, and (d) transformed into mean densities per stratum.

Table 5. Results of Calculations Carried Out on GLO Data by Drainage Class, Showing Sum of Distances (D); Sum of Radii (R); Mean Distance (MD); Mean Area per Tree (MAT); Class Density per Hectare (CDH); and Mean Diameter[a]

	Drainage class					
	Streamside	1[b]	2	3	4	5
D	36212.66	30093.16	24090.87	131372.39	117583.08	26891.85
r	1583.48	819.53	481.33	3751.93	3278.24	960.32
MD	699.94	936.75	910.08	809.13	758.38	546.10
MAT	1959649.50	3509988.60	3312974.30	2618749.90	2282415.40	1192992.50
CDH	51.00	28.50	30.20	38.20	43.80	83.80
$\overline{X}$ dia.	58.60	45.50	35.70	44.90	40.90	37.70

a all values except CDH are in cm.

b does not include three trees in cultivated and/or abandoned fields.

The results of our analysis of the GLO-derived data (Table 4) indicate that there are four distinct ecological groups. Group 1 (streamside forest) is composed mainly of species encountered in mesic habitats, since most members are subject to periodic floods that vary in duration. Species with modes in this class include elm, maple, sycamore, sassafras, cottonwood, sugar maple, basswood, and butternut. The relative importance of white oak and black oak is indicative of data points located along the banks of the four major tributary streams in the upland portions of the study area. Basically, all taxa encountered in streamside contexts have been observed in similar habitats in modern flood plain environments in the central Mississippi River valley (Hosner and Minckler 1963; Robertson et al. 1978)

Group 2 (flood-plain forest) consists of taxa with modes in drainage class 1--hackberry, ash, hickory, walnut, mulberry, box elder, and honey locust. The flood plain of the Mississippi River is a mosaic of wet, mesic, and transitional areas that support a diverse flora. The data indicate the presence of a mature flood plain forest (Hosner and Minckler 1963; Shelford 1954) in areas of the Mississippi River valley bottoms--probably on stable landforms and at the base of the Mississippi River valley bluffs--and along the course of the four tributary streams.

Before discussing the next group, it should be reiterated that drainage classes are meant to serve as sampling units, and that drainage classes often show distinct differences in vegetation (Reeder et al. 1983; Warren 1976). However,

differences must have meaning statistically. When the chi-square statistic was applied to the GLO-derived data, we found that there was not a significant difference among drainage classes 2, 3, 4, and 5 (X^2 = 21.33; df = 27). However, there are certain taxa that occur only within a certain drainage class. Thus, we will discuss four subgroups rather than ecological groups, since the groups are based on the presence of certain taxa and are not statistically unique.

At a general level, the study area can be thought of as an oak-hickory forest that stretches from upper flood plain to the level uplands. However, there are important trends in the forest that are worth considering. First, there is a general trend, from drainage class 2 to drainage class 5, from mesic to dry taxa (not including oak and hickory). In subgroup 1 (class 2) we note many of the mesic species one would expect to encounter in bottomland and lower-slope contexts, e.g., walnut, mulberry, elm, and plum. In subgroup 2 (class 3), while some of these taxa are present, their relative density is very low and their species density per hectare is less than 1 stem/ha (Table 4). In subgroup 3 (class 4), most of the mesic taxa are absent, and pine (a xeric taxon) is present. Finally, in subgroup 4 (class 5), black oak rivals white oak in importance, indicating that the uplands in the study area are the most moisture deficient.

These data indicate a gradual transition from mesic deciduous forest to xeric deciduous forest from drainage

class 1 to drainage class 5. The dominance of black oak, white oak, and hickory in drainage class 2 through 5 is not surprising given the description of the section lines by GLO surveyors (discussed below). Importantly, the near absence of sugar maple (n = 3) compared to the numbers encountered in recent ecological surveys out in the river hills region along the Missouri River (Wuenscher and Valiunas 1967; Rochow 1969), suggests that we are dealing with virgin forest and not a reforested area. In the above-mentioned studies, the researchers encountered extensive stands of sugar maple in areas that had been logged extensively during the nineteenth and twentieth centuries.

Tree density is highest in drainage class 5 (83.8 stems/ha) and lowest in drainage class 1 (28.5 stems/ha) (Table 5). Forest-density values indicate that the bottomland forest was open and that slope forests were sparsely timbered. Mean forest density for the study area (33 stems/ha) is lower than that of most other study areas--especially those along the Missouri and Mississippi rivers (Table 6). However, forest density in drainage class 5 is similar to those derived for drainage class 5 in other study areas (Table 7). The low forest density in the study area probably is the result of two factors: (1) the nature of the steeply dissected landscape in upland areas, and (2) the dynamic nature of the Mississippi River flood plain.

The first point is best illustrated in Figure 7. As can be seen, many section-line descriptions describe flint ridges, broken and stoney land, and rocky land. In addition, a great number of section lines (n = 49)

Table 6. Comparison of Mean Number of Stems per Hectare from 12 Geographic Areas

Area[a]	Mean number of stems per hectare
Black Belt Forest, Alabama	205
Montgomery County-River Hills, Missouri	137
Boone County-River Hills, Missouri	132
Loutre River, Missouri	121
Callaway County-River Hills, Missouri	116
Little Femme/Osage River, Missouri	94
City of Columbia, Missouri	94
St. Charles County, Missouri	91
Butler County, Missouri	81
Cannon Reservoir, Missouri	51
Oak Openings, Wisconsin	35
Ste. Genevieve, Missouri	33

[a] Sources of data include Jones and Patton (1966)--Alabama; Wuenscher and Valiunas (1967)--Montgomery, Boone, and Callaway counties, Missouri; Haas (1978)--Loutre and Little Femme/Osage rivers and St. Charles County, Missouri; Voigt (1984)--Butler County; Warren (1976)--Cannon Reservoir; Reeder et al. (1983)--City of Columbia; and Cottam (1949)--Wisconsin.

Table 7. Comparison of Mean Number of Stems per Hectare for the Study Area and Other Areas in Missouri

Area[a]	Drainage class						
	Streamside	1	2	3	4	5	Mean
Little Femme/Osage	-	129	188	76	102	109	121
Cannon Reservoir	123	48	60	74	53	25	51
City of Columbia	61	104	190	77	59	72	94
Butler County	81	91	120	84	48	73	81
Ste. Genevieve	51	29	30	38	44	83	33

[a] Sources of data include Haas (1978)--Little Femme/Osage; Warren (1976)--Cannon Reservoir; Reeder *et al*. (1983)--City of Columbia; Voigt (1984)--Butler County.

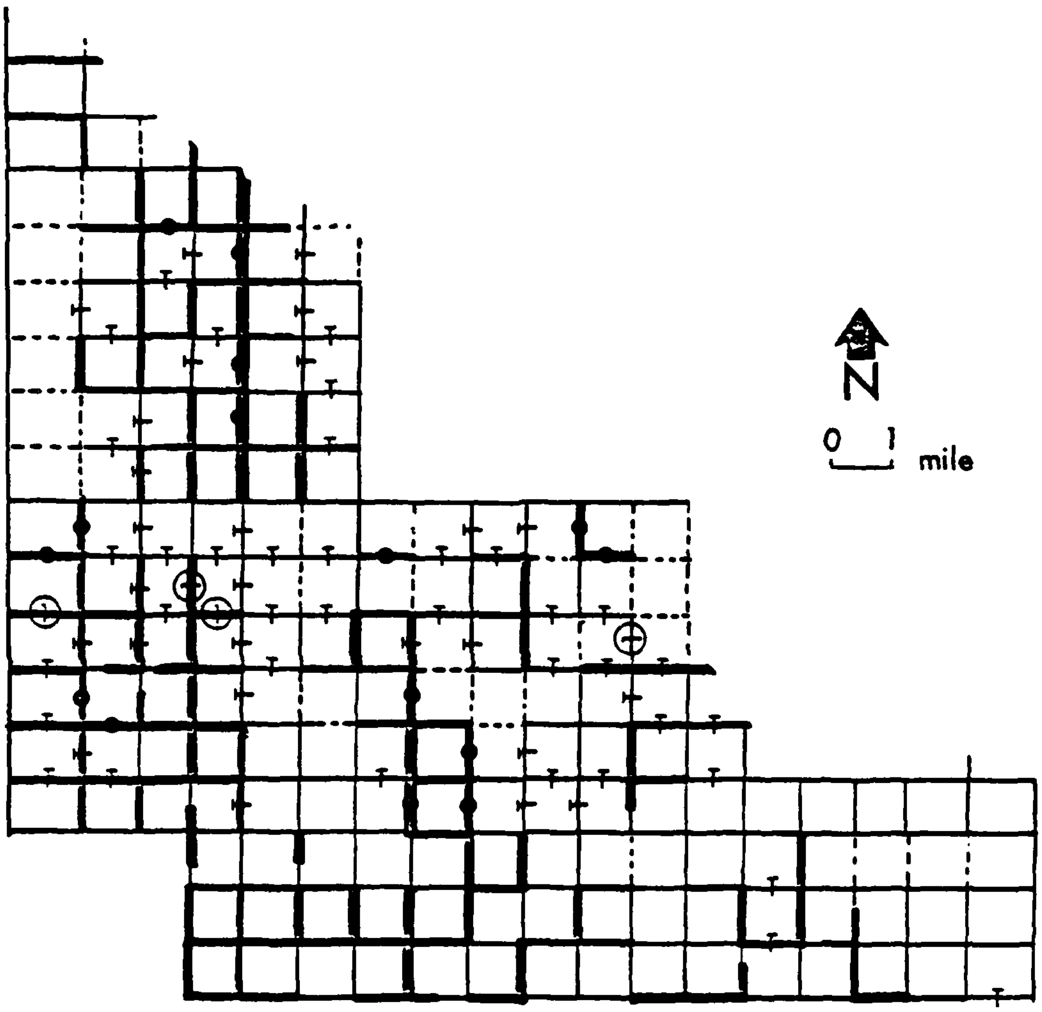


Figure 7.Section-line descriptions in the study area. (— =ridges, bottoms, and rolling areas; T=thin timber; ▬ =flint hills, broken, stoney, rocky, or poor land; ⊢=timber small with saplings; and ● =scrub oak overstory)

include grassland taxa in the descriptin of understory vegetation. Finally, the surveyors themselves report section-line descriptions of thin (n = 50) or scrub (n = 13) timber in upland areas.

The second point is supported by USDA-SCS soils data (Figure 6). The Mississippi River flood plain in the study area is very dynamic. As a result of continuous episodes of channel abandonment and migration, very few elevated, stable landforms remain. Most have been destroyed by the river or buried under sediments deposited during subsequent overflow stages of the Mississippi River. Hosner and Minckler (1963) and Shelford (1954) point out that mature, extensive flood-plain forests only develop on stable landforms. When river valleys are dynamic, one encounters communities in various successional stages, and mature flood-plain forests are absent. In addition, the high water table--in association with frequent flooding of the low-lying Mississippi River flood plain--contributes to the maintenance of wet prairie and marsh communities (see Franz and Bazzaz 1977).

The Model

Given these three data sets--and the results of the quantitative analysis of the GLO-derived data--we present a model of early historical-period vegetation in the study area. Discussion of the model is divided into two parts--bottomland flora and upland flora. Because of the size of the study

area, we do not present a map of the proposed distribution of the ecological groups and/or floral communities. Rather, one can use USGS topographic maps and determine the distribution of the flora by using the drainage class perimeters and matching them with the elevations presented on the maps. For the Mississippi River flood plain, we refer the reader to Pittman's (1770) map for use as a basemap.

Bottomland Flora

It is apparent from the data that at the time of Euro-American settlement of the Mississippi River flood plain in the Ste. Genevieve locality, forested areas were restricted mainly to the banks of the Mississippi River and the four major tributary streams.

Riparian (streamside) forest along the Mississippi River probably consisted mainly of willow and cottonwood, and in some places included individuals of shade-tolerant species such as box elder and maple. As one leaves the Mississippi River flood plain and moves up the tributary streams, the streamside forest takes on quite a different character as a result of (a) increased elevation, (b) the presence of a less wet/mesic habitat, and (c) the relative stability of the landscape when compared to that of the Mississippi River flood plain. As a result, one encounters many of the species typically found in drainage class 1 (e.g., hackberry, walnut, sycamore, elm, and hickory) rather than the willow-cottonwood forest found along the banks of the Mississippi River.

Group 1 (bottomland forest) was restricted to the Mississippi River bluff base and flood plain of the major tributary streams. This forest was not very dense, though many of the economically important taxa (e.g., hickory, sugar maple, ash, and walnut) were relatively abundant. Remnants of the bottomland forest probably extended for a distance up the perennial and intermittent streams that fed into the four tributary streams. In some areas, such as on north-facing slopes and in coves, mesic taxa may have extended into drainage classes 3 and 4.

Dry-prairie areas occurred on sand ridges that dotted the flood plain of the Mississippi River. Wet-prairie areas probably were quite extensive, though during prolonged dry periods the wetland floral species were replaced by herbaceous plants (e.g., ragweed, rushes, and sedges) (see Hus 1908). There is no evidence of aquatic communities in the study area.

Upland Flora

The upland flora of the study area consisted primarily of oak-hickory forest and cedar glades. The GLO-derived data indicate that mesic dropped out of the deciduous forest as one moved upslope (Table 4). Once again, if mesic species were present, they often were restricted to the courses of a stream or on sheltered slopes where sufficient areas of soil existed, i.e., where erosion was not pronounced.

Settlers probably encountered a very sparse forest, and in many areas the forest may have been interspersed with prairie-like areas. The references to scrub forest, grassy areas, and prairie-specific taxa (e.g., red root and huckleberry) in the GLO records support this contention. However, in drainage class 5, an area of loess soils, forests were relatively dense (Table 7). In some areas pine was an element of the oak-hickory forest.

LATE HOLOCENE ENVIRONMENTS

Major warming and cooling trends associated with the retreat of glaciers from the central and upper Midwest, and subsequent relative stabilization of the westerlies (Wendland 1978:276), resulted in changes in spatial distributions of plant communities that gradually led to stabilization of the present configuration of major biomes and their ecotones. Detailed models of midwestern Holocene climate can be found in Bernabo and Webb (1977), Butzer (1977), King (1973, 1980), King and Allen (1977), and Wendland (1978). Of primary concern here is climatic change since 3000 B.P., i.e., the late Holocene.

During the Sub-Atlantic episode (2760-1680 B.P.), much of the midcontinent witnessed a general relief from hotter and drier Hypsithermal conditions. As precipitation increased in many areas of the Midwest, the prairie-timber boundary migrated to the north and west as mesic deciduous forest reoccupied slopes and other suitable upland contexts (Bernabo and Webb 1977). In some areas, such as the Illinois

River valley (Butzer 1977), the period was one of maximum reforestation. Transitional soils began to develop in areas near the prairie-timber boundary and water tables probably rose considerably as springs and streams were rejuvenated and runoff increased. Mesic and transition plant taxa proliferated along sheltered coves, at the base of bluffs, on north-facing talus slopes, and in bottomland contexts.

Between 1680 and 1200 B.P. (the Scandic climate episode), warmer temperatures blanketed the central United States and _Quercus_-dominated forests and upland grasslands maintained relatively stable distributions. In some areas contexts conducive to the growth of mesic plant taxa may have decreased in extent. Around 1200 B.P. (the beginning of the Neo-Atlantic episode) moisture increased in northeastern Pennsylvania and Wisconsin (Swain 1978), in the Plains (Wendland 1978), and along the forest-tundra border in Canada (Sorenson _et al_. 1971). Temperatures were still warm, and although effective moisture increased, there does not appear to have been any vegetational discontinuity marking the beginning of the Neo-Atlantic.

However, with the onset of the Pacific climate episode (850-400 B.P.), a vegetational discontinuity (a shift in relative percentages of co-occurring taxa) does appear in the pollen record (Bernabo 1981; Gregg 1975; Wendland and Bryson 1974). Increased penetration by pacific air masses during the summer months resulted in droughty conditions and higher temperatures. During this period grasslands

and prairies attained their greatest extent since the Hypsithermal (Bernabo and Webb 1977). Bernabo (1981) states that the period from 950-750 B.P. was the warmest time in the Midwest during the past 2000 years. Changes in temperature and moisture regimes resulted in lowered water tables, droughty conditions, a decrease in stream flow and frequency and duration of overflow stages, and ponding of tributary streams of the Mississippi River.

In sheltered areas such as north-facing slopes and coves, mesic taxa probably occurred in numbers and proportions similar to those of the Sub-Atlantic episode (Asch et al. 1972; Butzer 1977). The peak of the Pacific occurred around 600 B.P. (Bernabo 1981). Ameliorating conditions began soon afterwards in Wisconsin, northeast Pennsylvania, and Canada. In the American Bottom, pollen data indicate dry prairies became wet prairies around 550 B.P. (Gregg 1975).

This change signaled the beginning of the Neo-Boreal climatic episode. While the first evidence of the Neo-Boreal (cooler and moister conditions) is evident in the pollen records from Wisconsin (430 B.P.) and Michigan (500 B.P.), cool and moist conditions probably peaked in the Midwest between 350-200 B.P. (Bernabo 1981). During this period forest made significant inroads into grassland areas (see Geis and Boggess 1968). In northeastern and central Missouri, comparison of GLO records with soils data indicates that the Neo-Boreal prairie-timber boundary expanded into upland

prairie and that this boundary is discontinuous with the SCS prairie-timber soils boundary (Reeder *et al*. 1983; Warren 1976). This phenomenon also has been documented in central and western Missouri (Howell and Kucera 1956; Voigt 1984) and Iowa (Loomis and McComb 1944). Under this favorable moisture and temperature regime, mesic taxa gained access to previously inaccessible sites. The significance of these transgressions (see Wood 1976) is realized when viewed in the light of work by Loomis and McComb (1944), which reveals that 69% of prairie soils in sample counties in Iowa were covered by forest during the Neo-Boreal.

A warming trend began around 200 B.P., and by the mid-nineteenth century a warmer and drier climatic regime had become established. A substantial warming period occurred subsequently between A.D. 1930 and 1960 (Bernabo 1981; Butzer 1977).

Bauman Site Setting

It appears from soils data that the Bauman site probably was situated in a dry prairie on a sand ridge along a channel of the Mississippi River. After the channel was abandoned by the Mississippi, it may have become a slough.

During the Pacific climatic episode (850-400 B.P.) conditions were somewhat drier and warmer than those during the Neo-Boreal and recent times. Given those conditions, the following

model of vegetation can be constructed. In the uplands, grassland areas probably expanded into open woodlands and onto steep, well-drained slopes. Ponded sinkholes either dried up or their water levels were reduced significantly. Overstory and understory mesic taxa such as hickory and walnut would have been restricted to (a) well-drained terraces (Freeburg soils) and bottomlands (Haymond and Wilbur soils) where the water table remained sufficiently high to permit their growth, and (b) north-facing slopes, coves, and talus slopes where the distribution and relative abundance of taxa probably were similar to that during the Sub-Atlantic climatic episode (cf. Asch et al. 1972; Butzer 1977) (Figure 8).

In the flood plain, dry prairies expanded into areas that had supported wet prairies (cf. Gregg 1975). Since there is no evidence that the hydrologic regime of the Mississippi changed to any significant degree, backswamps, oxbow lakes, and sloughs probably still were active, though many of these may only have been water-filled during the months when flooding was common. Backswamps adjacent to natural levees along the active river channel probably supported wet prairies or marshes since the water table in such contexts was close to the surface and there was a greater likelihood of flooding. In some areas, timber may have encroached onto bottomland prairie as (a) trees followed stream course as they made their way to the Mississippi, or (b) backswamp areas near the bluff line became drier, forming a more suitable habitat for taxa previously restricted to terraces, coves, and talus slopes (cf. King and Allen 1977).

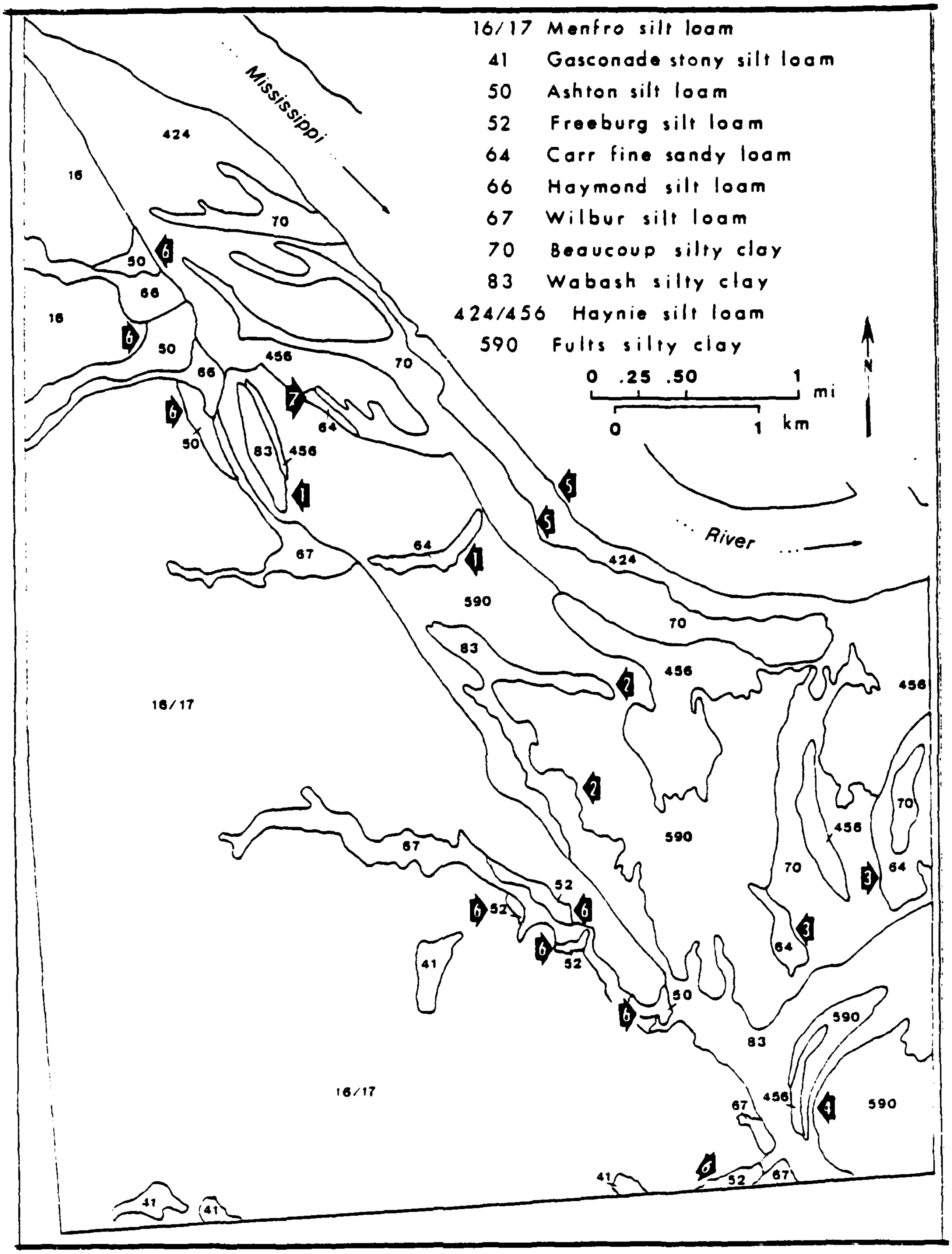


Figure 8. Map of soils (after SCS n.d.a.) and dated landforms in the Ste. Genevieve locality. Numbered landforms are dated as follows: (1) northern presettlement sand ridge and abandoned channel; (2) central presettlement meander scar and abandoned channel; (3) 18th-19th-century abandoned channel and sand ridges; (4) abandoned channel of the late 19th century; (5) historical and recent natural levees and backswamps; (6) Late Pleistocene terraces; (7) presettlement channel and slough.

Riparian forests of willow and cottonwood, with understory to shade tolerant taxa, occurred along the active channel of the river.

CHAPTER 3: FIELD METHODS AND ANALYTICAL SYSTEMS

The investigations and evaluation of the potential significance of the Bauman site required a field strategy designed (*a*) to determine the horizontal and vertical limits of the site, (*b*) to recover a representative artifact sample, and (*c*) to determine the eligibility of the site for inclusion on the National Register of Historic Places.

FIELD METHODS

We employed a three-tiered strategy of point-provenience surface collection, manual excavation of the test units, and limited mechanical stripping. This field strategy was aimed at (*a*) determining the horizontal and vertical limits of the site; (*b*) recovering an adequate artifact sample from the site; and (*c*) uncovering any evidence of sub-plow zone cultural deposits.

Initially, the site was divided into six hectares that were searched intensively for artifacts. Crew members--each approximately 2 m apart--walked from north to south flagging all tools, bones, shell, and temporally diagnostic artifacts. Artifact proveniences were plotted by transit. Permanent datums were located in two telephone poles west of the site. This purposive strategy was employed to gain a large sample of artifacts that would (*a*) help determine the horizontal limits of the surface scatter; (b) allow future comparison of temporally diagnostic artifacts with those recovered from other Mississippian sites; and (*c*) allow

us to determine the relative date of occupation of the site.

Two kinds of manually excavated test units were employed during the project--1-m^2 and 2-m^2 units (Figure 9). Test units were excavated below the base of deposits bearing cultural material. Each unit was excavated in 10cm arbitrary levels, and all soil was passed through ¼-inch hardware cloth.

Near the end of the project, five scraper cuts were made perpendicular to the axis of the washout by a tractor equipped with a blade (Figure 9). Each pass made by the scraper was approximately 10 cm deep and 4 m wide, and the total depth of each cut was between 50 cm and 1 m. In addition, two areas were cleared by a backhoe to below the plow zone, and a backhoe trench was excavated in the eastern portion of the site to a depth of approximately 3 m (Figure 9). These operations were carried out in hopes of locating intact sub plow zone cultural deposits in selected areas and to search for buried occupations.

ANALYTICAL STUDIES

Analytical systems were structured to answer questions relative to (a) the age and cultural affiliation of the site, based on temporally diagnostic artifacts; (b) the nature of activities represented and their relative importance during occupation; (c) the resources that were exploited and used by the inhabitants of the site, and (d) the season and length of occupation.

Ceramics were the predominant kind of cultural material recovered; their analysis was emphasized in this study.

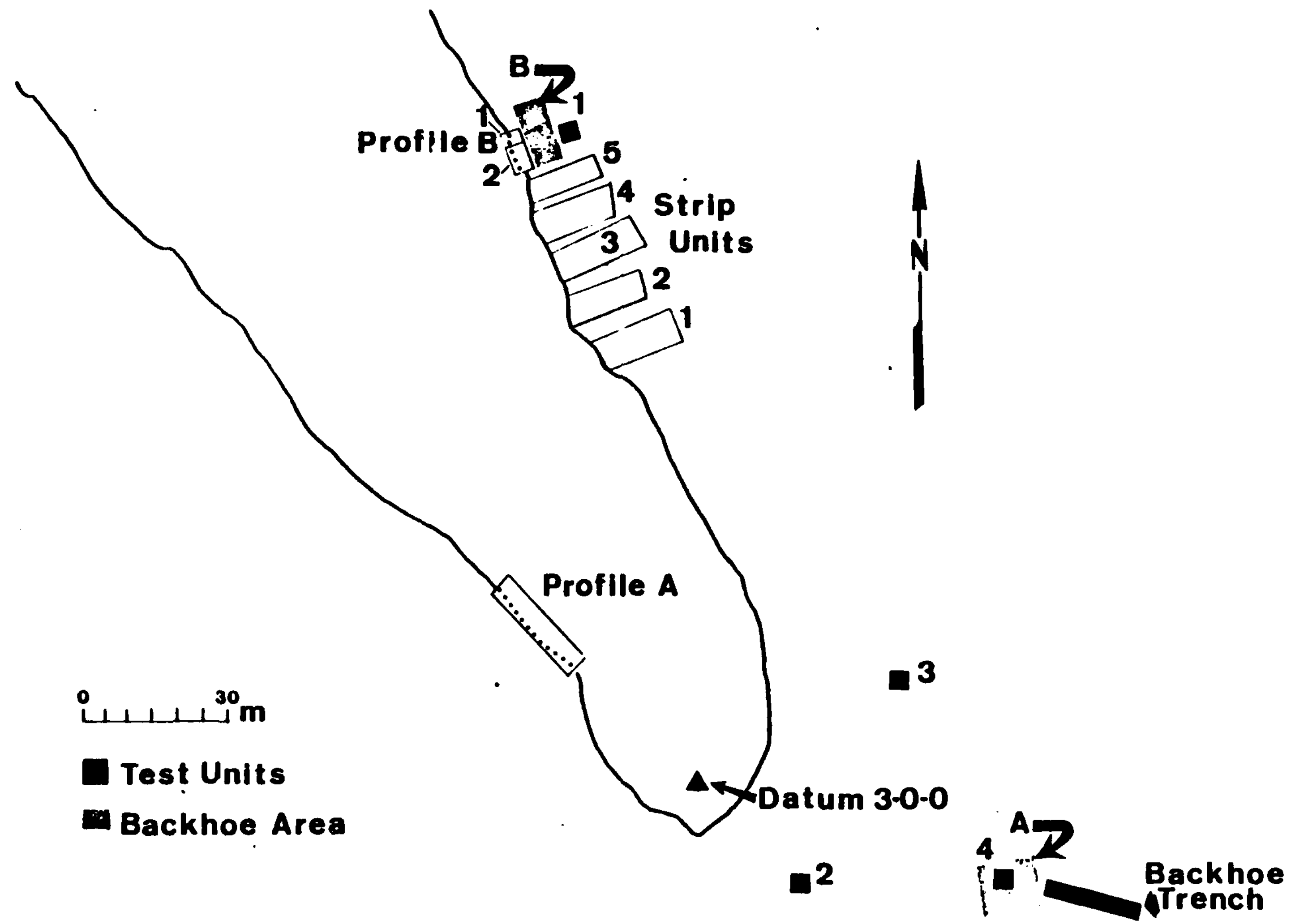


Figure 9: Map showing location of test units, profile units, and mechanically excavated areas.

All sherds were classified using standard, ceramic typologies used in the central Mississippi River valley. Although lithic artifacts did not occur in great abundance (except in surface collections), they are an important part of the archaeological record at the Bauman site. Two analytical systems were used in the analysis of lithic artifacts, including a morphological-technological system and a use-wear system.

The morphological-technological system provides a description of an artifact and discusses the techniques used to produce the piece. This system also provides information relative to the age of a site. By examining certain morphological and/or technologicasl attributes of artifact form, and correlating these attributes with those of specimens recovered from dated archaeological contexts, the relative age of a specimen--and thus of a site--can be inferred.

The use-wear system is particularly important in determining the activities that occurred at the site and, indirectly, the kinds of resources being used. In some cases season of occupation can be inferred from the presence of certain tools indicating activities that involved resources available only at a certain time of the year.

Metric observations were made on all bifacially flaked or groundstone artifacts. Other lithic artifacts were not measured individually. The incidence of thermal alteration among chipped-stone artifacts also was noted. The attributes suggesting thermal alteration include pot-lid flake removals, a reddish or pinkish discoloration, crenulated breaks,

and the presence of a lustrous- and/or soapy-feeling surface.

Lithic Analysis[1]

The Morphological-Technological System

The morphological-technological system initially is used to divide the lithic material into three categories: chipped stone, groundstone, and unmodified rock. Chipped stone includes the products and by-products of the manufacture of chert tools through the use of percussion- and/or pressure-flaking techniques. Groundstone artifacts include pieces of sandstone and basalt, as well as other materials that exhibit evidence of having been pecked, battered, and ground and smoothed. Unmodified rock includes pieces of chert, sandstone, river cobble, and other materials that exhibit no evidence of intentional human modification.

Chipped-Stone Artifacts

Chipped-stone artifacts include any piece of chert that exhibits evidence of having been flaked by man. Such evidence includes the presence of flake scars, striking platforms, and/or bulbs of force. The products and by-products of all stages of the lithic-reduction sequence are included in this group. In this study chipped-stone artifacts first were identified as to the stage of lithic reduction sequence represented. Classes of chipped-stone artifacts include bifaces, cores, flake tools, and debitage. For

[1] by Robert L. Reeder

purposes of discussion and description, various specimens within each class can be grouped by shared morphological and/or technological attributes.

Among the chipped-stone artifacts, the most extensively and systematically flaked pieces usually are bifaces. A biface is defined as an artifact that has been flaked on two surfaces to thin and/or shape it. Bifaces do not include pieces of chert that were worked bifacially to produce usable flakes (i.e., cores) or pieces of chert that were flaked bifacially along an edge to enhance the usefulness of that edge (e.g., retouched flakes). Bifaces include both finished and unfinished tools.

Certain bifacial forms, especially hafted, pointed bifaces (i.e., projectile points), represent stylized forms that have been found to be temporally diagnostic. In this analysis, these artifacts also are placed in a typology that is based on attributes such as blade morphology, overall size, hafting morphology, and flaking technology.

Cores are another major class of chipped-stone artifacts. They are differentiated from unmodified chert by the presence of one or more inverse bulbs of force, truncated flake scars, and often by the presence of a prepared striking platform.

Cores are grouped by form, a procedure that incorporates both technological and morphological attributes of a specimen. These groups include polyhedral cores--irregularly shaped pieces of chert with flake scars indicating nonsystematic removal of flakes in multiple directions; tabular cores--blocky chert pieces that were flaked in only one or two areas

and/or direction; and blade cores--a specialized core type with a single prepared striking platform with parallel flake scars.

Debitage includes shatter and flakes. Shatter consists of angular, blocky pieces of chert with no apparent inverse bulb of force and with cortex absent from at least two surfaces. Flakes include primary decortication flakes, secondary decortication flakes, interior flakes, and biface thinning-resharpening flakes. Primary decortication flakes have cortex covering all of the dorsal surface as well as the striking platform. Secondary decortication flakes have cortex covering only part of the dorsal surface and/or striking platform. Interior flakes lack the characteristics used to identify the other types of flakes mentioned above. Biface thinning-resharpening flakes are small flakes removed during the manufacture and maintenance of chipped-stone tools. These flakes are identified by the presence of a faceted striking platform and several flake scars on the dorsal surface. In addition, they usually have thin cross sections, logitudinally curved ventral surfaces, and sometimes slight lips or overhangs along the ventral edge of the striking platforms.

Flake tools are pieces of debitage that were used without further modification. Retouched flakes were modified intentionally prior to use to enhance the effectiveness of an edge. Retouch usually is visible macroscopically. Utilized flakes are those pieces of debitage that are

used as tools but which were not intentionally modified. Utilized flakes may or may not exhibit macroscopic indicators of having been used.

Groundstone Artifacts

Groundstone artifacts are tools that have been shaped by grinding, pecking, and/or smoothing. Groundstone tools also include pieces that were not shaped intentionally but which were worn and/or altered by use. These artifacts usually are made of sandstone, quartzite, chert, hematite, granite, or basalt. While some groundstone tools were hafted, others were handheld. Except for the hafted groundstone tools, most other pieces exhibit little if any evidence of intentional shaping.

Unmodified Rock

Unmodified rock includes lithic material that was not modified during tool production. This category includes (a) raw material that was transported to a site for later processing into stone tools and (b) material brought to the site for use in other activities other than stone-tool production.

Use-Wear Analysis

A sample of artifacts was examined microscopically for physical evidence of prehistoric use. On lithic artifacts, the record of this prehistoric use is preserved in the

form of microwear polish, striations, or edge damage (Newcomer and Keeley 1979). Using data derived from controlled replicative experiments, tool function is inferred based on the co-occurence of certain forms or modes of wear present. Various studies (Ahler 1971, 1979; Keeley 1980; Lewarch 1982; Odell 1981; Odell and Odell-Vereecken 1980; Semonov 1964; Tringham *et al*. 1974) have successfully identified use-wear on lithic artifacts and inferred tool function based on this patterned wear.

Several different approaches have been developed in the study of use-wear. These approaches included (*a*) the "macroscopic" approach, in which the artifacts are viewed either with a hand lens or by the unaided eye (Lewarch 1982); (*b*) the "low-power" microscope approach, in which magnifications in the range of 10-100x are employed (Ahler 1971, 1979; Odell 1979, 1981; Odell and Odell-Vereecken 1980; Tringham *et al*. 1974); (*c*) the "high-power" microscope approach, in which artifacts are viewed at magnifications of 24-400x (Keeley 1977, 1980; Newcomer and Keeley 1979); and (*d*) the use of scanning electron microscope at magnifications of much greater than 400x (Hayden 1979). Each approach has advantages as well as disadvantages (see Reeder *et al*. 1983:15). In general, as the range of magnifications increases, the precision of the tool-use interpretation also increases. This increase in precision and accuracy of use-wear identification and interpretation is directly associated with a significant increase in the cost of

the equipment necessary and the time required for the examination of each specimen.

Procedure

This study employed the low-power-microscope use-wear approach. The decision to use this approach was determined by the availability of the necessary equipment and the relatively large number of specimens that had to be examined in a relatively short period of time. The equipment used consisted of a Bausch and Lomb Stereo Zoom 7 coaxial microscope with a magnification range of 10-105x and an American Optical universal focusable halogen illuminator. The study relied heavily on previously published experimental use-wear studies (Ahler 1971, 1979; Odell 1979, 1981; Odell and Odell-Vereecken 1980; Tringham *et al*. 1974) and on an experimental collection curated by the American Archaeology Division, University of Missouri-Columbia.

Lithic artifacts exhibiting intentional retouch or bifacial flaking were examined microscopically for use-wear. The edges and faces of each artifact were scanned initially at a magnification of 20x. Those areas or edges displaying use-wear or edge damage were then reexamined at a higher magnification of from 35-70x. If it was determined that the wear or damage was from prehistoric use, observations regarding the wear were recorded.

The basic unit of analysis is the employable unit (E.U.), defined as a "portion (an edge, projection, facial arris, or facial surface) of an implement that would provide a continuous work surface without reorienting the entire

implement when that implement is used against another material to perform work" (Knudson 1979:270). A series of observations and measurements recorded are listed below.

Artifact Classification -- Every artifact found to have use-wear present was identified first as to the technological-morphological class represented.

Portion Represented -- That portion of a specimen represented as noted. Identified portions include intact pieces, end fragment (proximal or distal end if distinguishable), medial fragment, lateral fragment, and corner fragment.

Location of Wear -- Based on the kinematic nature of the different functions such as cutting, scraping, graving, or boring, different portions of the available edges are used (Ahler 1979; Lewarch 1982:155). To aid in the interpretation of the prehistoric use of a tool, the location of the use-wear was recorded. Locations include corner, point or projection, proximal end, distal end, undifferentiated end, and lateral end.

Nature of the Edge -- For this discussion, it was noted whether the utilized edge was intentionally retouched prior to use or whether the employed edge was used without prior modification, and it refers to the angle of the edge prior to its use and wear. As pointed out by Lewarch (1982:157), the spine-plane angle is most likely to reflect

the edge condition selected for use. During the analysis, the spine-plane angle was measured with a goniometer.

Interpretation of Use-Wear

As noted, the basic unit of analysis in the study is the employable unit. Tool use and the nature of the material being worked are inferred from the use-wear present on the employable units. Some artifacts have multiple employable units that exhibit use-wear from the same or different functions; most represent either multipurpose tools or tools that were used for the same function on multiple occasions, with different employable units being utilized from a single use of the tool. An example of this includes wear from the hafting of tools. While this wear indicates that the tool was hafted, it does not indicate the actual tool function.

Edge damage resulting from techniques used in the lithic-tool manufacturing process also was observed. This type of damage consists of edge crushing or grinding along the edges of some bifaces or along the striking platform of flakes. Since edge damage is not considered use-wear, it was not recorded.

The inferred function for each employable unit showing wear consists of two separate "characteristics of use damage" (Odell and Odell-Vereecken 1980). The first characteristic refers to the material worked. It is important to note that Odell's experimental work has produced some preliminary information regarding the accuracy of inferred tool uses

based on use-wear (Odell and Odell-Vereecken 1980). In general, there is a greater accuracy in predicting the manner of tool use rather than the kind of material worked.

The principal factors considered under nature of activity are the directionality of the movement of the edge of a tool relative to the material worked and the manner and relative length of time of the contact between the tool and the material worked. Dimensions used to identify this characteristic include location of wear; whether the wear is unifacial or bifacial; the kind of wear; and the forms of wear. The attributes of dimensions used to infer function are based primarily on the work of Odell (Odell 1981; Odell-Vereecken 1980:98-100) and are listed below.

The first major kind of use-wear results from functions or activities in which tool movement is longitudinal to the working edge. Odell identifies several different activities of this nature: cutting, sawing, and slicing or carving. All of these functions produce use-wear that is bifacial with scarring on both surfaces. While cutting produces scarring that alternates between sides, sawing and slicing produce wear that is bifacial but more pronounced on one surface. As described by Odell (Odell and Odell-Vereecken 1980:101), however, the low-power microscopic use-wear approach is not always capable of distinguishing between these variations of cutting. Thus, unless the wear was very distinctive, the different forms of cutting are not distinguished here.

In scraping activities, the movement of the tool is transverse to the working edge. Use-wear from scraping is almost always unifacial. As with various forms of cutting, the projections along the employable unit are the first and most extensively worn. Variations of scraping that are identified by Odell (1981) include planing and whittling. These distinctions, however, are not made in this study.

Graving may exhibit use-wear similar to that produced by either cutting or scraping. In the case of graving, the use-wear is located on a point or tip of a projection rather than along an edge. Boring or drilling consists of a downward and rather lateral movement of a tool. Resulting use-wear includes scarring that extends from the tip down along the lateral edges of the shaft. Damage may be unifacial or bifacial.

Chopping produces bifacial damage along the employable unit, with the wear being relatively massive and well defined. If observable, striations are oblique to the cutting edge. Wedging produces use-wear that is similar to that from chopping, but striations are perpendicular to the cutting edge. Use as a projectile point results in wear somewhat similar to chopping, with scarring that is well defined and concentrated near the tip. Striations are parallel to the longitudinal axis of the tool. Abrading usually produces wear on a surface of a tool rather than along an edge. Use-wear is in the form of abrasion, with the extent of the wear being determined by the nature of the material of the tool and the material being worked.

As defined by Odell (Odell and Odell-Vereecken 1980:100), pounding involves a surface rather than an edge of a tool, with wear consisting of pitting and cracking. Dodd (1979) describes the wear from pounding somewhat differently, as consisting of severe, overlapping step and hinge fractures with grinding from stone-on-stone contact.

The forms of wear described above refer to the nature of the function or the manner in which a tool was used. These data are then combined with those referring to the second "characteristic of use-wear," or that evidence indicating the kind of material worked. Time and monetary restraints prevented us from continuing the analysis to this stage.

Ceramic Analysis

The ceramic analysis focused on rimsherds and decorated bodysherds. This approach was implemented to gain a ceramic sample that could be tied to established ceramic types encountered at Mississippian sites in the central Mississippi River valley. Thus, sherds without diagnostic characteristics are not covered in our analysis. Such sherds were sized, each had its thickness determined, and each was weighed.

The ceramic types mentioned in this section are derived mainly from Griffin (1949) and Vogel (1975). The place of certain ceramic types in the Mississippian chronology for the region is based on Fowler and Hall (1972) and Milner *et al*. (1984).

In our discussion of the ceramic assemblages from the Bauman site, we use the following terms for rim forms: vertical, angled, flared, and curved (Figure 10). The difference between an angled rim and a flared rim is that the intersecting planes of the body and the rim at the juncture of the neck and vessel body (Figure 11) form an angle greater than 90° on flared rims, and an angle less than 90° on angled rims. Otherwise, the other terms are consistent with those used by Vogel (1975) and Milner _et al_. (1984). However, certain rim forms established by Vogel (1975) actually describe the shape of the lip on a particular rim. Therefore, we use the following terms to describe lip forms on vessel rims: rolled, thickened, and extruded (Figure 10).

The ceramic types encountered in our analysis are described below:

Mississippi Plain (Plate Ia) -- This ceramic type also is referred to as St. Mary's Plain (Keslin 1964) and Ste. Genevieve Plain (Chapman 1980). The type is ubiquitous on Mississippian sites in the central Mississippi River valley. Paste ranges from fine to coarse, with medium and coarse most common. The tempering agent is crushed mussel shell. Sherd colors range from light gray through black but also include tan, brown, rust, buff, and orange. The core usually is gray in color. Both interior and exterior surfaces usually are smooth.

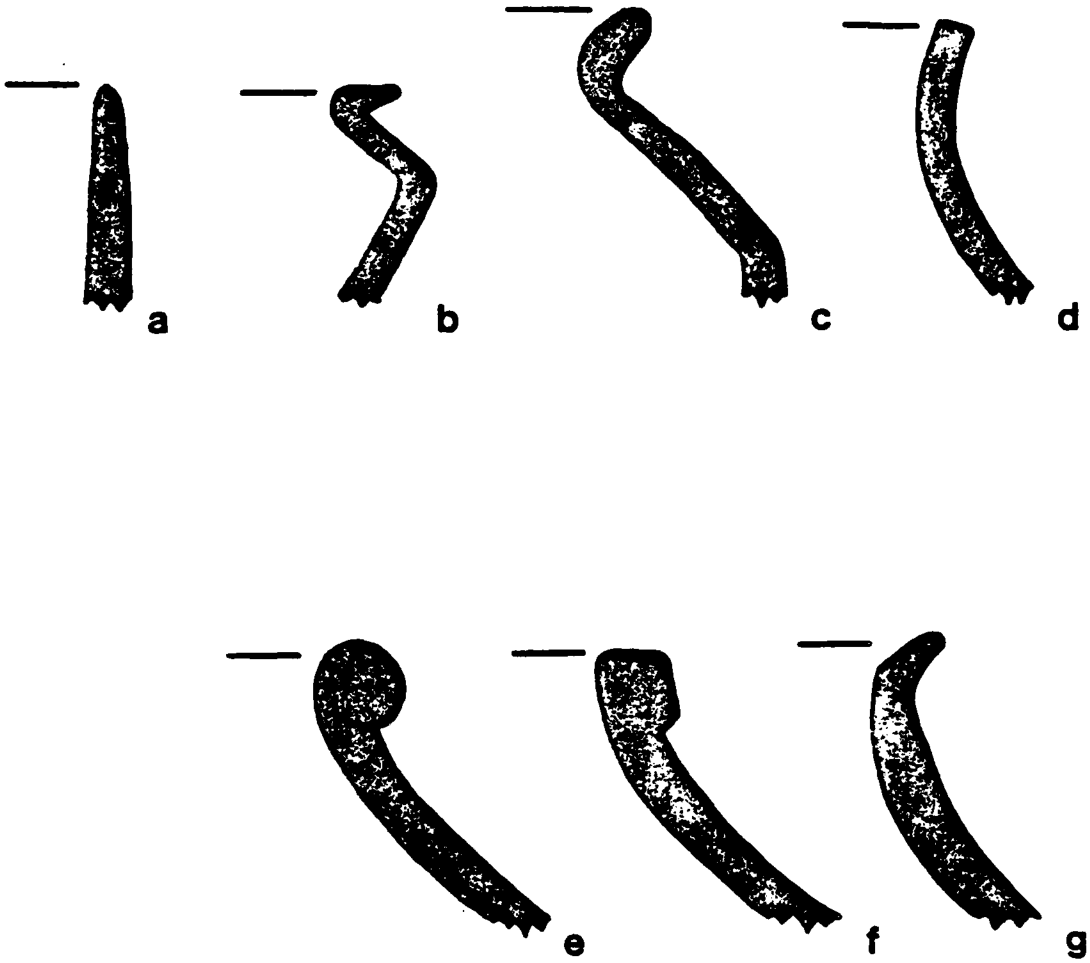


Figure 10. Rim forms (a-d) and lip forms (e-g) used in the analysis of the Bauman site ceramic assemblage (a, vertical; b, angled; c, flared; d, curved; e, rolled; f, thickened; and g, extruded).

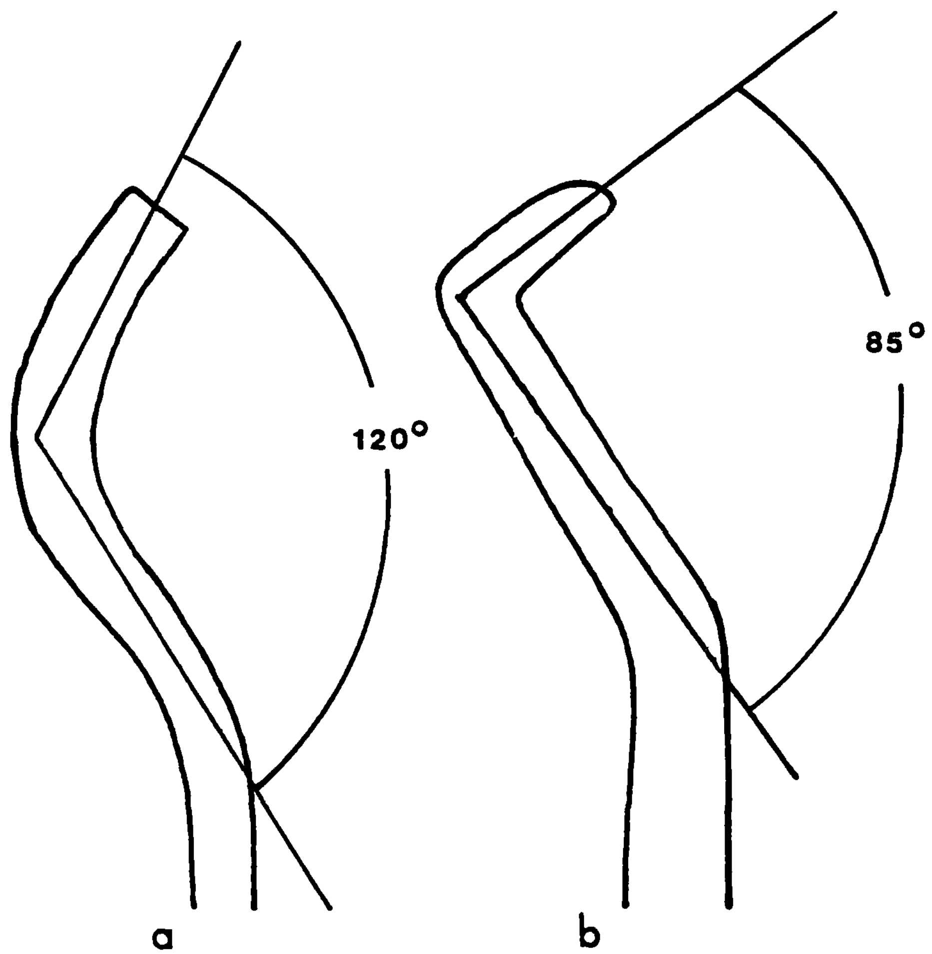


Figure 11. Difference between flaring rim (a) and angled rim (b).

Fabric Impressed (Plate I b) -- this term is used to describe large pans with coarse paste whose outer surfaces exhibit an impression of twined fabric. In Missouri this type is termed Saline Fabric Impressed (Keslin 1964) or Kimmswick Fabric Impressed (Chapman 1980). Temper consists of crushed mussel shell. Surfaces are usually red, brown, or tan, and core colors are gray, brown, tan, or black. While the exterior surface is fabric impressed, the interior surface usually is smooth.

Cahokia Cordmarked (Plate I c) -- Both rimsherds and bodysherds were recovered from the site. Paste usually is medium, with crushed mussel shell serving as temper (although some sherds are grit tempered). Surface colors are tan and/or buff, and core colors are gray and tan. The exterior surface is covered with cord-wrapped paddle impressions that run vertically on the body of the vessel. The interior surface is smooth.

Powell Plain (Plate I d) -- This ceramic type has a fine paste and is tempered with crushed mussel shell. Most sherds have black exterior surfaces, though a few are tan. Core color usually is gray to black. Some surfaces are highly burnished, but others exhibit evidence of a tan slip having been applied to the exterior surface (see Griffin 1949:49-50); both varieties were recovered at the Bauman site.

Mississippi Red-Filmed -- This is a shell-tempered ware, and the paste ranges from medium to coarse. This type is similar to Monk's Mound Red (Griffin 1949) and Merrel Red-Filmed (Vogel 1975).

Wells Incised (Plate I e) -- This type consists solely of shallow plates with fine paste and crushed mussel-shell temper. The exterior and interior surfaces are smoothed and/or polished and often are gray or black in color. The decoration consists of incised lines that form "rectilinear patterns of contiguous line-filled trinagles; line-filled triangles with alternating black triangles; or groups of oblique lines" always located on the upper rim surfaces (Griffin 1949:56).

Ramey Incised (Plate I f) -- This type has fine to medium paste and crushed mussel-shell temper. Surface treatment usually consists of smoothing, though some sherds are burnished. Color of exterior and interior surfaces range from gray to black. This type gets its name from the incised decorations along the rims of jars. The decoration usually consists of scrolls, concentric, arched semi-circles; oblique parallel lines; parallel horizontal lines on the shoulder area; and ladder designs (Griffin 1949:51).

Punctate (Plate II a) -- The single specimen of this coarse-paste ware with shell temper is a rim from a large handled jar. The paste is similar to that of Mississippi

Plain, as are the colors of the interior and exterior surfaces of the vessel. The decoration consists of a double row of punches on the shoulder and a zone of incised designs. The piece exhibits a degree of similarity to Manly Punctate, a type that occurs in southeastern Missouri, western Kentucky, Tennessee, southern Illinois, and northern Alabama (Phillips et al. 1951:147).

Wickliffe Incised (Plate II b) -- This type is represented by several poorly fired sherds and a funnel fragment. The sherds are tan in color and the exterior surfaces have been smoothed. The interior surface of the bodysherds and the funnel fragment are coarse and crudely modeled. This type is restricted to southeastern Missouri, northeastern Arkansas, extreme western Kentucky, and southern Illinois (Reagan 1977; Williams 1954). Decoration usually consists of horizontal, oblique, and/or vertical incised lines.

Red-and-White Painted (Plate II c) -- The single sherd of this type has fine temper, and both surfaces are covered with a cream-colored slip. Two red diagonals run across the outer surface of the sherd. This type exhibits similarities with other late Mississippian red-and-white types (e.g., Nodena Red and White) found in the lower Mississippi River valley (see Morse and Morse 1983; Phillips et al. 1951).

CHAPTER 4: THE ARTIFACT ASSEMBLAGE

This section consists of two parts in which we describe and discuss the artifacts recovered from the Bauman site. The first part deals with artifacts recovered on the surface of the site, and the second addresses the artifact assemblage from subsurface contexts.

SURFACE ARTIFACT ASSEMBLAGE

Three different collections of surface artifacts were made at the Bauman site. Two collections consist solely of "grab samples," i.e., the collections were not systematic and artifact proveniences were not recorded. The third surface collection employed the point-provenience technique. Each of the collections is discussed separately, and important artifacts are described and representative examples illustrated.

St. Louis District Collection

A portion of the site area was collected by archaeologists from the St. Louis District on May 26, 1983. At that time the northern portion of the site area (i.e., this area includes the washout) still was under water. A collection of artifacts was made in the area near profile B (Figure 9). The collected assemblage includes temporally diagnostic ceramics, bifaces, groundstone tools, debitage, bone, shell, ceramic sherds, and historical artifacts (Table 8).

Table 8. Artifacts Included in the St. Louis District Surface Collection

Artifact class	Total
Ceramics/Bodysherds:	
Cahokia Cordmarked	3
Fabric Impressed	1
Mississippi Plain	82
Mississippi Red-Filmed	3
Salt Pan	6
Lithics:	
Interior flake	2
Secondary Decortication flake	1
Core (polyhedral)	1
Basalt flake	2
Miscellaneous·	
Bone	2
Shell	4
Historic:	
Nails	2
Pipestem	2
Pipe bowl	1
TOTAL	112

Table 9. Ceramic Types Present in the St. Louis District Surface Collection

Ceramic type	Rim form					Other form			
	Flared			Angled	Vertical				
	Rolled lip	Thickened lip	Extruded lip			Vessel base	Handles	Indeterminate	Total
Mississippi Plain[a]	5	5	5	6			2		23
Salt Pan					5	2			7
Powell Plain				1					1
Ramey Incised				1					1
Mississippi Red Filmed					1		2		3
Cahokia Cordmarked				1					1
Mississippi Plain[b]	1	1	1				7		10
Unknown					1				1
Total									47

[a] curved shoulder
[b] angled shoulder

Ceramic Artifacts

A total of 47 rimsherds were recovered in this surface collection (Table 9). In addition, three undecorated fragments from three different plates also were recovered (Figure 12). Mississippi Plain (Figure 12 a) rimsherds dominate the rim assemblages; salt pan rimsherds are second in frequency of occurrence. The predominant rim form is flared (38%), followed by angled rims (19%). Six rimsherds have coarse temper, three have fine temper, and the remainder have medium-sized temper. A sample of the various rim forms is illustrated in Figure 13.

Ninety-four bodysherds were recovered, including specimens from the following ceramic types: Cahokia Cordmarked (3), salt pan (6), Fabric Impressed (1), Mississippi Red Filmed (3), and Mississippi Plain (82). The decorated rimsherds are discussed below.

Ramey Incised--angled rim with rolled lip, fine temper, gray (Figure 12 b; Plate I f).

Cahokia Cordmarked--angled rim with a thickened lip, medium-sized temper, tan (Figure 12 c; Plate I c).

Powell Plain--angled rim, fine temper, exterior and interior surfaces are covered with a tan slip (Figure 12 d).

Mississippi Red Filmed--vertical rim, medium-sized temper (Figure 12 e).

Lithic Artifacts

Several chipped-stone and groundstone artifacts were collected, including two interior flakes, a secondary flake, a core,

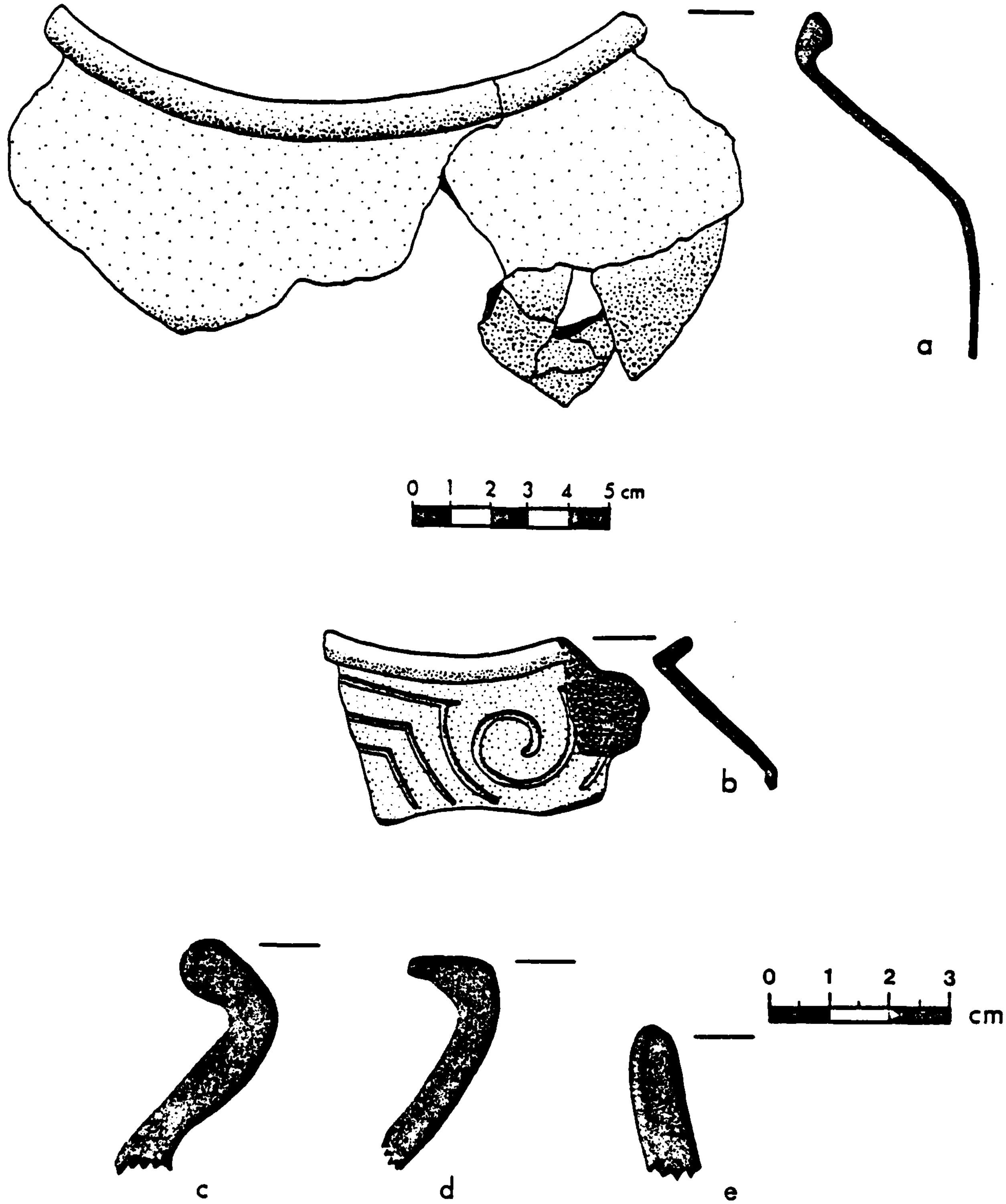


Figure 12. Decorated rims and rim profiles from the St. Louis District surface collection (a and b drawn by Tim Pauketat).

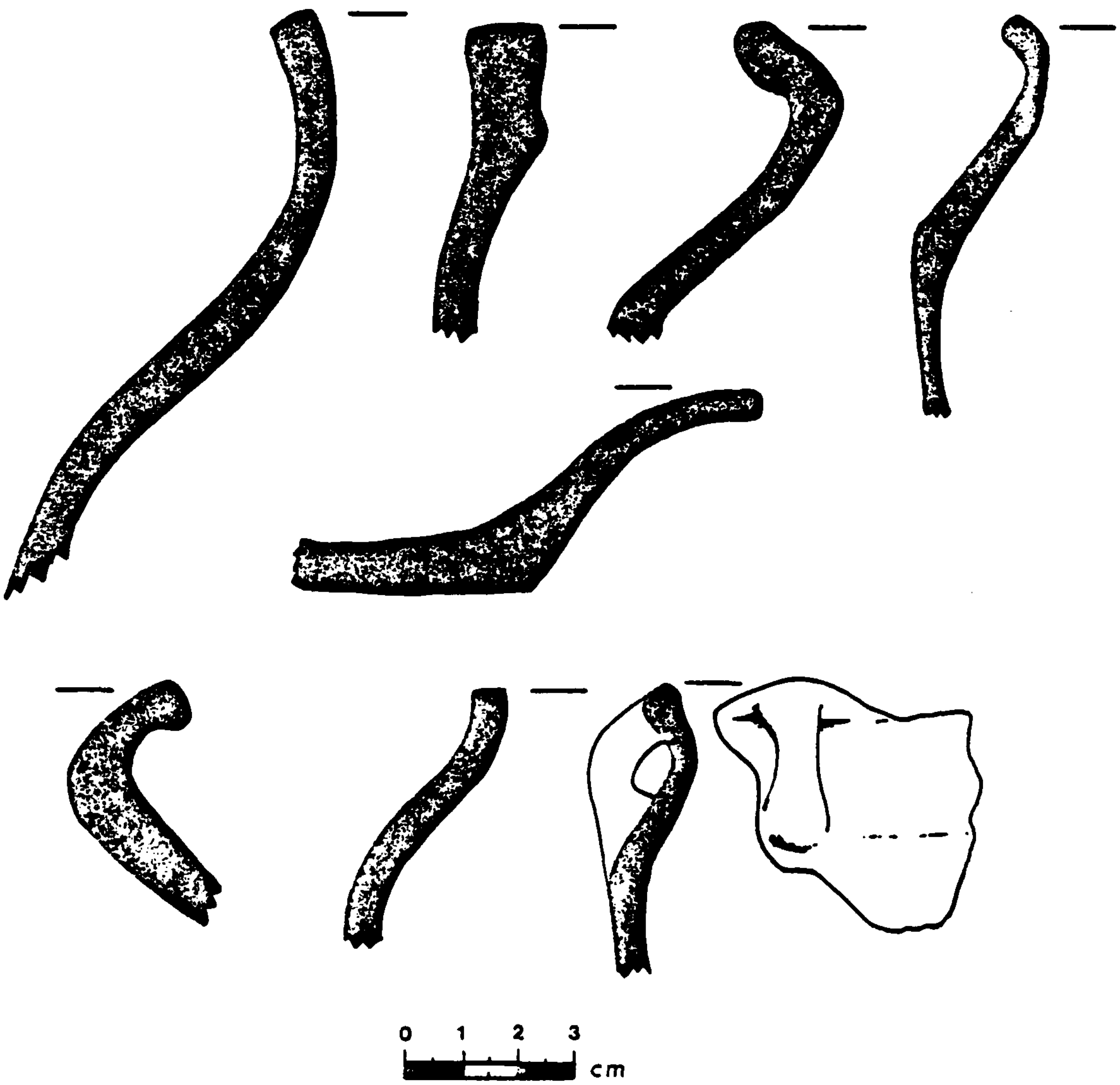


Figure 13. Profile of a sample of rimsherds in the St. Louis District surface collection.

and two basalt flakes. In addition, several tools also were recovered; these are described and discussed below.

Chipped-Stone Tools

Only three chipped-stone tools are included in this collection. They include a basalt hammerstone, a biface fragment of Mill Creek chert, and a hoe fragment of Mill Creek chert.

The biface fragment (Plate III b)--a medial segment--is lenticular in cross section and exhibits no evidence of use-wear. The hoe fragment is 150 mm long and 115 mm wide (Plate III a). Each of the three lateral margins, as well as both surfaces, exhibit evidence of polish.

Groundstone Tools

This surface collection contains eight tools of basalt, two of granite, and two of sandstone. Artifacts were shaped by a process of battering, pecking, and abrading.

Sandstone

One sandstone artifact is an abrader. Although it has two roughly parallel grooves on one surface, it exhibits no evidence of use-wear or intentional modification on the other surfaces. The other sandstone artifact has smoothed surface with a slight circular depression (i.e., pit) in the center of one surface of the artifact.

Basalt

Basalt was obtained in the St. Francois Mountains (Jack Ray, personal communication) in the western portion of Ste. Genevieve County.

Specimen 26-4--A lateral fragment and portion of a bit from a groundstone tool. Use-wear indicates that the tool was used as an axe. It is 59 mm long and 34 mm wide. All exterior surfaces are smoothed.

Specimen 26-8--An end of a groundstone tool, apparently broken during manufacture. No use-wear was observed. However, the exterior surfaces exhibit evidence of extensive battering and pecking. The fragment is 31 mm long and 30 mm wide.

Specimen 26-7--A proximal end of a groundstone tool. This fragment has all exterior surfaces smoothed, except near the butt of the tool, where numerous battering facets are present. The margins have been squared near the end, and rounded near the distal portion of the fragment. The artifact is 65 mm long and 45 mm wide.

Specimen 26-12--This piece appears to be a blank or an unfinished groundstone tool. All exterior surfaces have been pecked or battered extensively, and some areas on each surface have been abraded. However, the artifact has not been shaped into any recognizable tool form. The specimen is 123 mm long and 32 mm wide.

Specimen 26-13--This tool was used as a chisel. It is eight-sided, and all exterior surfaces have been smoothed. However, a large area of the proximal portion is unfinished and has been extensively battered. The chisel is 127 mm long and 32 mm wide.

Specimen 26-14--This tool was used as an adze (Plate IV c). Wear occurs at both ends. The pole end has been battered, and the bit exhibits smoothing and striations. A large flake has been removed from the bit and probably represents edge damage from use. In addition, only the surfaces that form the edges of the bit exhibit evidence of pecking and smoothing. The adze is 131 mm long and 58 mm wide.

Specimen 26-15--This tool was used as an adze (Plate IV a). Several flakes have been removed along the bit edge and at the proximal end--perhaps as a result of use. Smoothing occurs primarily on the margins, bit, and surfaces. The artifact is 150 mm long and 77 mm wide.

Specimen 26-16--This tool was used as an adze (Plate IV b). The bit is flared, and the distal end is smoothed. Battering facets and pecking occur on all surfaces. Large battering facets from use occur on the proximal end. The adze is 174 mm long and 77 mm wide.

Granite

Two granite artifacts are in the St. Louis District Collection. There are two areas that may have served as the source areas for this raw material. First, there are the St. Francois Mountains to the west of the locality. The other possibility is that

glacial erratics, eroded from Pleistocene deposits along the Mississippi River valley, could have served as the source of the raw material for the two tools recovered.

Specimen 26-5--This groundstone tool fragment consists of a medial fragment of a "celt." The exterior surfaces are smoothed, and there is no evidence of battering and/or pecking. The artifact is 32 mm long and 65 mm wide.

Specimen 26-6--This is a distal end of a groundstone tool used as an axe. The bit exhibits heavy wear as evidenced by flaking and striations. This fragment is 70 mm long and 79 mm wide.

Kapps Collection

This assemblage of artifacts was collected by two local residents after the floodwater receded. The artifacts were collected in the washout just north of profile B (Figure 9). The collection includes flakes, cores, bifaces, groundstone tools, ceramics (bodysherds and rimsherds), and bone. A selection of artifacts from the collection was borrowed for analysis. These artifacts are described and discussed below.

Ceramic Artifacts

Five rimsherds were selected for analysis. These include a Wells Incised plate fragment, two Mississippi Plain rimsherds, one Punctate rimsherd, and one Cahokia Cordmarked rimsherd. Each is discussed below.

Punctate--flared rim with a rolled lip, shouldered jar with handled attachment, decorated with a triangle design on the rim and a double row of punches on the shoulder (Plate II a), buff to gray in color, coarse temper, interior surface smoothed/burnished, exterior surface smoothed (Figure 14 a).

Wells Incised--plate rim with zoned chevron pattern of triangles and inverted triangles, fine temper, reddish-brown slip applied to both surfaces (Figure 14 b; Plate I e).

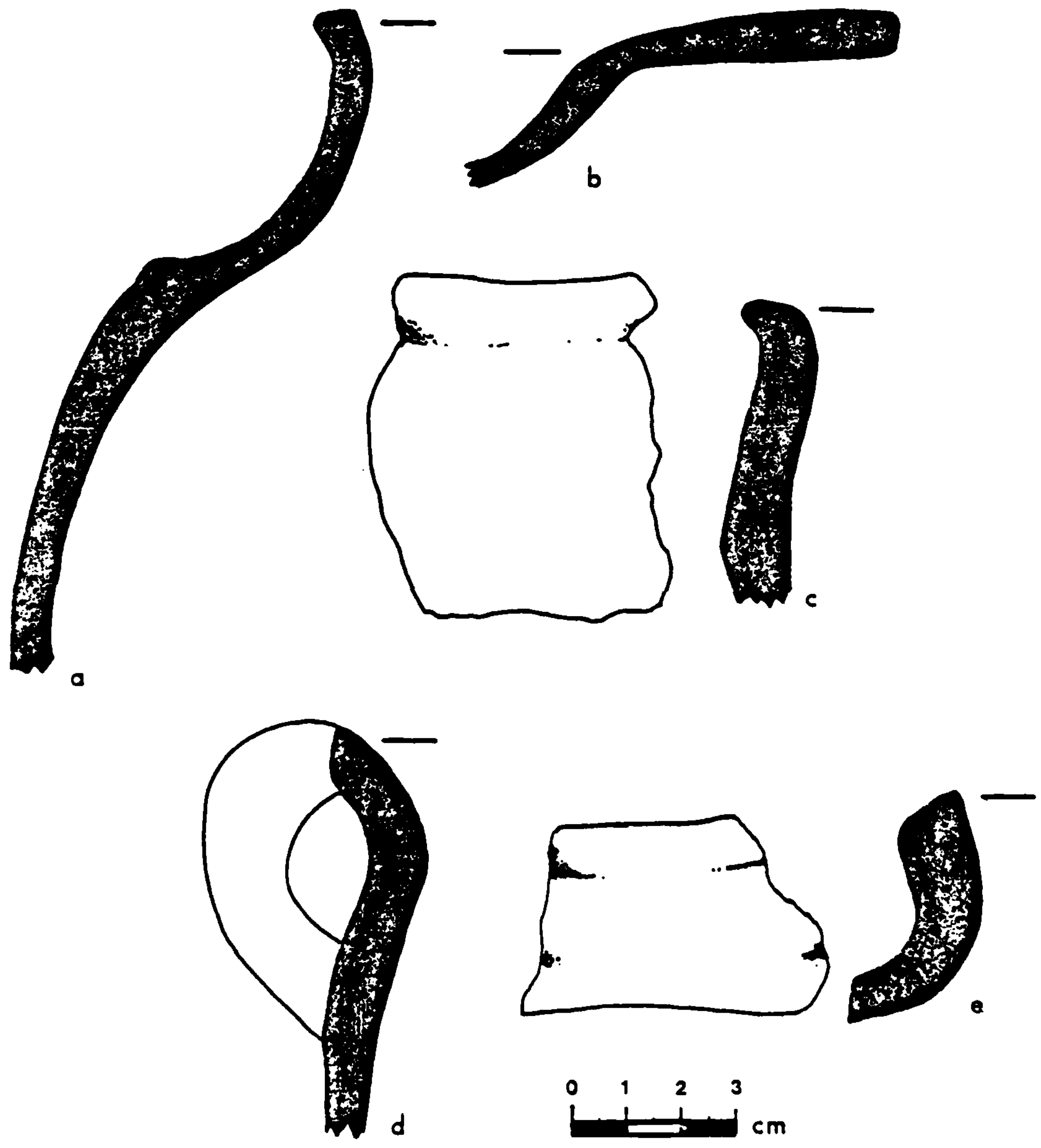


Figure 14. Rims and rim profiles in the Kapps surface collection.

Mississippi Plain--flared rim with extruded lip, smoothed exterior surface, medium-sized temper, tan (Figure 14 c).

Mississippi Plain--angled rim with thickened lip, handled, coarse temper, buff (Figure 14 d).

Cahokia Cordmarked--flared rim with thickened lip, medium-sized temper of shell and grit, tan (Figure 14 e).

Lithic Artifacts

Sixteen lithic items were selected for analysis. These artifacts are made of chert, limestone, and basalt. While no temporally diagnostic artifacts are included, the group provides additional information about basalt groundstone tool manufacture and associated site activities.

Chipped-stone Tools

Four chipped-stone tools are included in the sample. One of the specimens--a hammerstone--is of Burlington chert. The other three items are of Mill Creek chert.

Specimen 38-12--A chert hammerstone. It exhibits battering facets on surfaces and along margins. Spherical in shape; 62 mm in diameter (Plate V a).

Specimen 38-2--The distal end of a chipped-stone hoe. Large primary flake scars on both surfaces with retouch along the edges. Use-wear consists primarily of polish. It is 89 mm long and 140 mm wide (Plate V b).

Specimen 38-3--An intact chipped-stone adze. Large primary flake scars occur on both surfaces. Use-wear consists of flake scars, polish, and smoothing on the bit. It is 149 mm long and 51 mm wide. (Plate V c).

Specimen 38-4--A chipped-stone hoe fragment consisting of the distal end and a lateral margin. Large primary flake scars occur on both surfaces, with retouch limited to the margins. Use-wear consists of polish and some striations. The hoe is 197 mm long and 86 mm wide (Plate V d).

Groundstone Tools

Thirteen groundstone artifacts were selected for analysis, including 2 of limestone and 11 of basalt. Nine of the 11 basalt artifacts appear to be blanks or preforms. These artifacts are discussed below.

Limestone

Specimen 38-1--An intact limestone "hoe." It is 142 mm long and 92 mm wide. It is extremely weathered or has been burned (Plate VI a).

Specimen 38-16--A relatively large (252 mm long and 122 mm wide) limestone "hoe." It has been extensively weathered or burned (Plate VI b).

Basalt

Specimen 38-13--This tool was used as a hoe. Use-wear consists primarily of polish. The hoe is 213 mm long and 110 mm wide (Plate VI c).

Specimen 38-15--This tool was used as a xe. The proximal portion of this tool exhibits battering facets on all surfaces. The bit exhibits edge damage and a high degree of wear. It is 87 mm long and 59 mm wide (Plate VI d).

There are nine artifacts that can best be described as blanks, preforms, or rough-outs. These basalt artifacts vary in size from 118 mm to 192 mm in length and 60 mm to 90 mm in width. Most exhibit evidence of primary flaking as well as areas where a portion of the surface has been slightly worked (Plate VII a-d). None exhibits retouch along the margins or the presence of use-wear.

UNIVERSITY OF MISSOURI SURFACE COLLECTION

An area south and outside of the wash was divided into six hectares. Members of the crew walked each hectare, flagging the locations of all cultural material. The provenience of each artifact was recorded using a transit. The collection contains 800 artifacts of bone, burned earth, burned limestone, ceramic and stone as well as some historic material (tables 10-12). The distribution of temporally diagnostic artifacts is shown in Figure 15. A brief discussion of artifact classes is presented below. Due to the size of the collection, many of the artifact classes are discussed summarily.

Ceramic Artifacts

This collection contains 511 ceramic sherds, including 449 undecorated bodysherds and 62 decorated rimsherds. Twenty-one of the bodysherds are missing or lack catalog numbers. Of the remaining 428 sherds, 45 have fine temper, 186 have coarse temper, and 197 have medium temper (Table 10).

Ten ceramic types are represented by decorated rims or bodysherds (Table 11). Sherds from each type are discussed below.

<u>Cahokia Cordmarked</u> -- Five sherds of this ceramic type are in this collection (Plate VIII h-l). The sherds range from 6.7-6.9 mm in thickness. Two have coarse temper and three have medium temper. All are buff in color.

<u>Fabric Impressed</u> -- Two sherds of this type were recovered from the site. Both sherds have coarse temper.

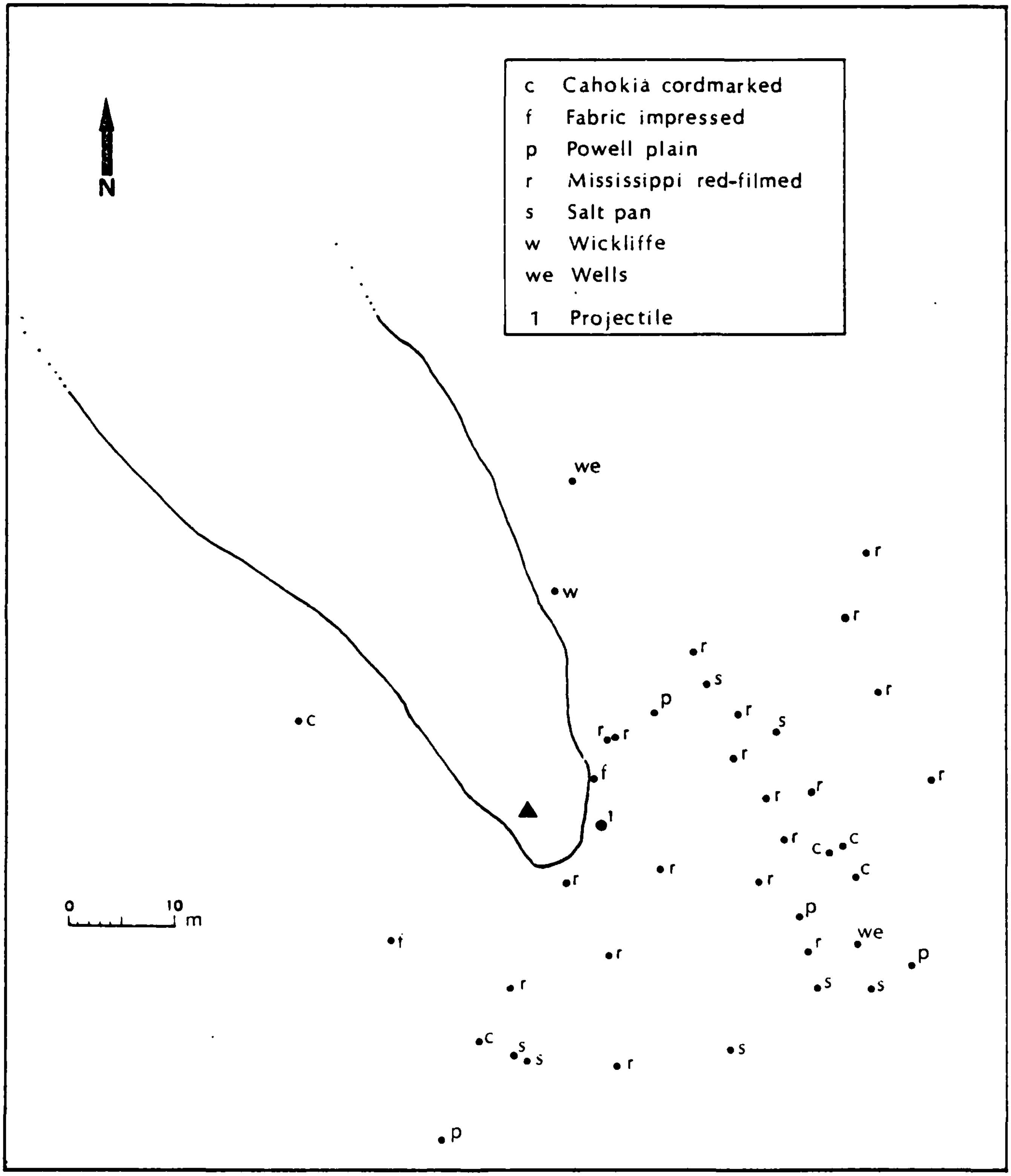


Figure 15. Distribution of temporally diagnostic artifacts in the UMC surface collection.

Table 10. Artifacts in the UMC Surface Collection from 23STG158

Artifact class	Total
Debitage:	
Cores (Polyhedral)	5
Cores (Tabular)	3
Shatter	14
Primary decortication flakes	6
Secondary decortication flakes	17
Interior flakes	64
Biface thinning/resharpening flakes	4
Basalt flakes	4
Retouched flakes	9
Unmodified Rock:	
Basalt	1
Granite	1
Limestone	51
Sandstone	6
Quartzite	1
Ceramics:	
Undecorated bodysherds (fine)	45
Undecorated bodysherds (medium)	197
Undecorated bodysherds (coarse)	186
Miscellaneous:	
Burned clay	2
Burned earth	1
Burned limestone	1
Modified galena	1
Slag	3
Unknown material	1
Bone	21
Historic	1
Total	645

Table 11. Ceramic Types Present in the UMC Surface Collection from 23STG158

Ceramic types (n = 62)

Cahokia Cordmarked (n = 5)	Fabric Impressed (n = 2)	Mississippi Plain (w/ handle) (n = 2)	Mississippi Plain (n = 19)	Mississippi Red-filmed (n = 18)
218	290R[b]	371R	665R, 704R	372R, 523
402	175	508-2R	633R, 677R	701, 543
457			123R, 573R	596, 301
52			408R, 277R	614, 441-2
446			389R, 384R	652, 226
			438R, 251R	597-2, 601
			547R, 256-1R	340, 297
			690R, 309-1R	338, 604
			309-2R, 668R	415-1, 409
			699R	

Powell Plain (n = 4)	Red & White (n = 1)	Salt Pan (n = 7)	Unidentified[a] (n = 1)	Wells Incised (n = 2)	Wickliffe Incised (n = 1)
352R	636	411R	617R	383R	679
204		292R		702	
567		373R			
431		336R			
		644R			
		220R			
		216R			

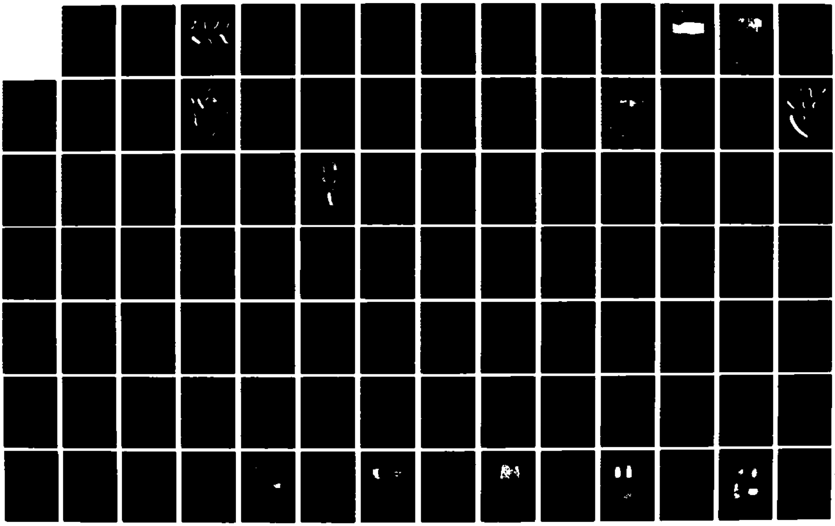
[a] Similar to Cahokia "crud."

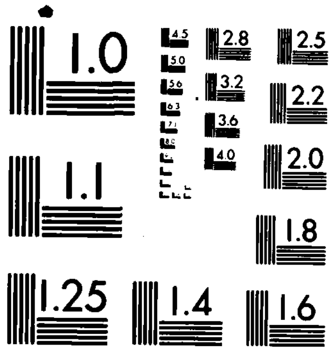
[b] R = rimsherd.

Table 12. Modified Lithics in UMC Surface Collection from 23STG158

Chipped-stone tools				Groundstone tools	
Bifaces (hafted) (n = 4)	Bifaces (fragments) (n = 4)	Basalt (adze (fragments) (n = 2)	Basalt (blanks) (n = 1)	Sandstone (smoothed surface) (n = 5)	Sandstone (abrader) (n = 2)
510	145	224	364	181	25
704	149-2	416		244	421
423	169			350	
44	96			353	
				23	

AD-A162 166 ARCHAEOLOGICAL TESTING OF THE BAUMAN SITE (23STG158) 2/3
STE GENEVIEVE COUNTY MISSOURI(U) MISSOURI UNIV-COLUMBIA
AMERICAN ARCHAEOLOGY DIV E E VOIGT ET AL MAY 85 23
UNCLASSIFIED DACW43-83-M-3837 F/G 5/6 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Mississippi Plain -- Two Mississippi Plain rimsherds with handles and several handle fragments (Plate VIII a-d) are included in the collection. In addition, 19 rimsherds of this type are in the collection; of these, 2 have coarse temper, 14 have medium temper, and 2 have fine temper--one was not classified. A sample of rimforms is illustrated in Figure 16.

Mississippi Red-filmed -- Eighteen sherds of this ceramic type are in the collection. Sherds range from 4.05-10.8 mm in thickness. Fifteen have medium temper, two have fine temper, and one has coarse temper. Over 61% (n = 11) of the sherds have a film on both surfaces. The color of the film ranges from reddish-brown (n = 6), to red (n = 10), to reddish-orange (n = 2).

Powell Plain -- Four Powell Plain sherds were identified in ceramic analysis, including a rim (Plate I d); three other sherds are illustrated in Plate VIII (e-g). Sherds range from 4.1-8.4 mm in thickness. All have fine temper with gray/black exteriors and smoothed buff/tan interiors.

Red and White -- A single sherd of this type is in the collection, and is illustrated in Plate II c. The sherd has fine temper and is buff in color. The exterior surface is decorated with a cream-colored slip and two red diagonal lines.

Unidentified --This sherd is mentioned here because it is quite similar to sherds of a type termed "Cahokia Crud." The single sherd in the collection is buff in color and has fine temper. The sherd is 10.73 mm thick. The exterior and interior surfaces are smooth.

Wells Incised -- Both specimens are fragments of plate rims. Both have gray/black exterior surfaces and fine temper.

Wickliffe Incised -- One sherd of Wickliffe Incised was recovered. The sherd has medium temper and is 10.25 mm thick. It is buff colored and is incised along one of the margins.

Before turning to a discussion of the lithic artifacts in the collection, it should be noted that (a) the rim sample in this surface collection is in very poor condition, and (b) as a result only three rim-types were identified:

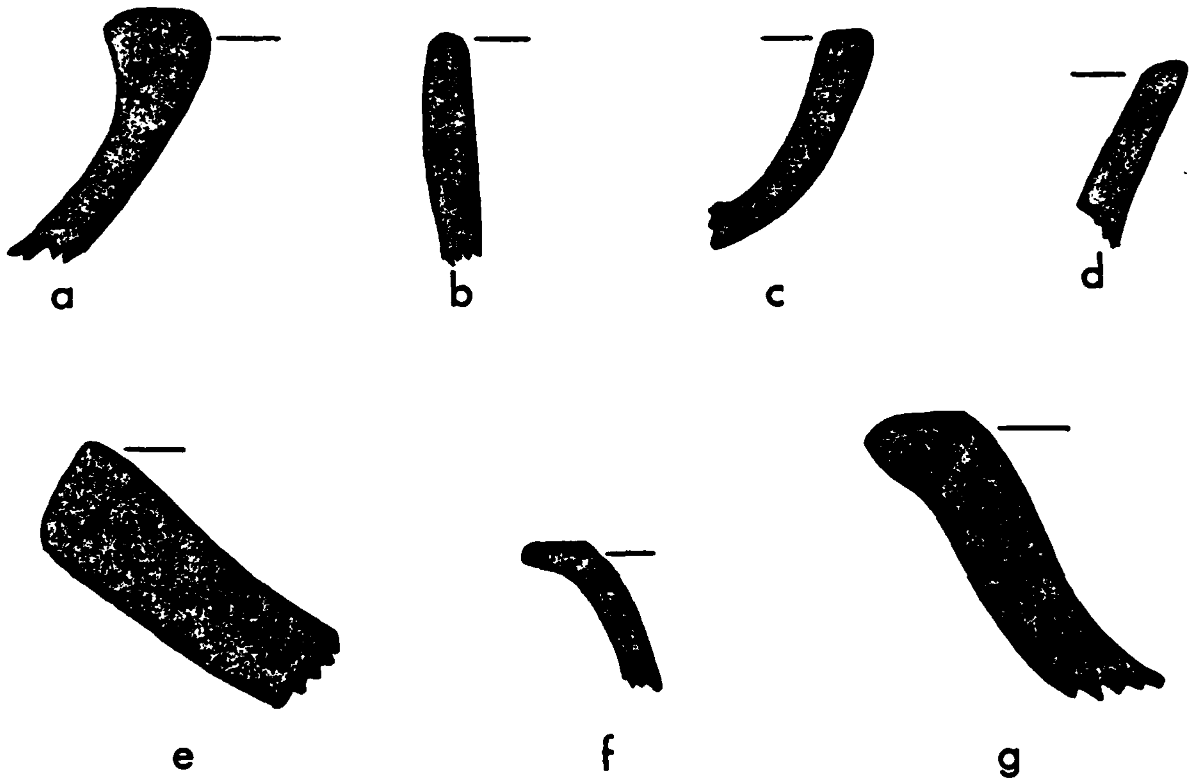


Figure 16. Rim profiles of sherds in the UMC surface collection.

curved (n = 9), flared (n = 5), and vertical (n = 6). The remainder of the rims are fragmentary, therefore form is indeterminate.

Lithic Artifacts

The UMC surface collection includes 60 pieces of unmodified lithic material, 15 utilized flakes, and 18 tools (Table 12). Types of raw material present include Burlington limestone, "root-beer" chert, Mill Creek chert, Kaolin chert, sandstone, limestone, and basalt. Only three temporally diagnostic artifacts were recovered, two of which are shown in Plate VIII (m-n).

The classes of debitage present are summarized in Table 10. Of the polyhedral cores, one is of Mill Creek chert, one is a cobble, one is of Burlington chert, and two are of root-beer (Ste. Genevieve) chert. The tabular cores are of quartzite, Mill Creek chert, and Burlington chert.

Use-wear analysis was carried out on 15 utilized flakes, four of which are retouched. One flake was used for cutting soft-medium material; seven were used to scrape soft material (three are retouched flakes); four were used to scrape hard-medium material (one is a retouched flake); and three were used for incising or graving (one is a retouched flake that also was used for scraping soft material).

Chipped-stone Tools

Specimen 704 -- This side-notched projectile point was manufactured from white chert that appears to have been heat treated. The blade is triangular with shallow side-notching and a straight base (Plate VIII m).

Specimen 510 -- This side-notched point of banded, gray chert was not heat treated. The notching is deep and the base slightly concave (Plate VIII n).

Specimen 423 -- This specimen is missing from the collection. It was manufactured from white chert and exhibits shallow side-notching, a sub-triangular blade, and an expanding base.

Groundstone Tools

Sandstone

Several pieces of sandstone were recovered, including seven sandstone tools (table 12, Plate VIII p-v) which are described below.

Specimen 353 -- This specimen is an almost square (32 mm X 31 mm) piece of sandstone and weighs 16 g. One surface exhibits wear from grinding (Plate VIII p).

Specimen 181 -- This tool is 50 mm X 81 mm and weighs 53 g. One surface exhibits grinding wear (Plate VIII q).

Specimen 350 -- This tool is 52 mm X 28 mm and weighs 56 g. One of its surfaces exhibits use-wear caused by grinding (Plate VIII r).

Specimen 23 -- One surface of this artifact is smooth from grinding (Plate VIII s).

Specimen 244 -- This sandstone artifact is 39 mm X 36 mm and weighs 35 g. The surface of this specimen also exhibits wear from grinding (Plate VIII t).

Specimen 25 -- This specimen is a roughly rectangular piece of sandstone with a single rounded groove in one surface. This tool was used as an abrader (Plate VIII u).

Specimen 421 -- This tool is also a rectangular piece of sandstone. It has two parallel grooves in one surface and also was used as an abrader (Plate VIII v).

Basalt

Three basalt tool fragments were recovered: a proximal end, a blank, and a bit fragment. Each is described below.

> Specimen 224 -- This 55 mm X 41 mm bit fragment weighs 22.5 g. It exhibits smoothing and striations that are perpendicular to the edge of the bit--traits commonly associated with adzing.
>
> Specimen 364 -- This basalt blank is 62 mm X 56 mm and weighs 115 g. As with other basalt blanks from Bauman, this specimen also has been shaped by removal of large flakes and by battering.
>
> Specimen 416 -- This artifact is 88 mm X 55 mm and exhibits battering facets and other damage at the proximal portion of the fragment. The remainder of the tool has been shaped by battering and smoothing (Plate VIII o).

SUMMARY

The University of Missouri-Columbia's systematic surface collection provides an interesting supplement to the other two surface collections from Bauman. The UMC collections includes both important distributive data and diagnostic artifacts (e.g., projectile points and a sherd of Red and White ware). What do these data tell us about the Bauman site and its structure?

Two explanations that may account for the presence of the surface material from Bauman are considered: (1) Surface materials outside the washout are surface remains from a plowed-out southern portion of the site. In other words, they are representative of cultural remains

that occur in the plowzone in the southern portion of the site, or (2) The UMC surface artifacts represent materials that were redeposited when the washout was formed and the subsurface deposits of the site were scoured. The relative merits of each are discussed briefly below.

Test units and backhoe trenches in the southern portion of the site failed to produce any significant sub-plowzone deposits, though it appears a thin band ($\pm$ 10 cm) of undisturbed cultural material may interface with, and exist below, the modern plowzone. However, the upper levels of the test unit failed to produce quantities of material roughly comparable to that of the UMC surface collection. In addition, artifact density decreases as one moves away, in all directions, from the washout. Thus we believe that this explanation is inadequate to account for the observations.

The second explanation appears to account for the distribution of artifacts. In addition, a similar phenomenon is documented along the margins of the washout, where the surface and first few centimeters of the sandy soil yielded many artifacts, but where subsurface testing produced none until the units were at the plowzone/soil interface or below. Thus it appears that many of the artifacts on the surface, outside the washout, were redeposited during the formation of the washout. Further evidence could be developed by plotting the weights or sizes of

surface artifacts. A predicted outcome of such an experiment would be evidence for a decrease in artifact weight and size as one moves away from the margins of the washout. Indeed, the largest artifacts were recovered in the washout, and none of the UMC surface artifacts comes close to being similar in size.

The UMC surface collection provides important information about the site. Data derived from the systematic nature of the collection, in combination with data derived from subsurface testing outside the washout, indicate that the UMC material represents redeposited artifacts--artifacts that once formed the bulk of the subsurface deposits in the southern and southwestern portion of the Bauman site.

SUBSURFACE ARTIFACT ASSEMBLAGE

In this section we discuss the results of our subsurface excavations. This includes a description of the artifacts recovered from four 1 m^2 and seven 2 m^2 test units, as well as those recovered from five scraper cuts and one backhoe area (Figure 9). Artifact classes are summarized for each unit; temporally diagnostic artifacts are discussed individually by unit.

Test Unit 1

This 1 m^2 unit was located approximately 10 m east of the washout (Figure 9). The first 20 cm of the unit consisted of dark brown silty clay with a high concentration of recently incorporated organic material. From 20-54 cm below surface the soil consisted of a dark brown silty clay loam. At 54 cm the soil changed to a light brown silty loam with yellow mottling and continued to 70 cm. At approximately 70 cm the soil changed to a light yellowish-brown sandy silt and continued to the bottom of the test unit (i.e., 130 cm). Artifacts were recovered to a depth of 110 cm (Table 13).

Feature 2 (figures 17 and 18) was encountered at approximately 60 cm and extended to approximately 112 cm. Feature fill consisted of grayish-brown silt loam with some charcoal flecking; artifact density was very low. No diagnostic artifacts were recovered from the unit.

Table 13. Material Recovered from Levels in Test Unit 1

Level	Artifact classes	Ceramic: Undecorated bodyshered	Debitage: Interior flake	Decortication flake	Biface thinning/ resharpening flake	Retouched flake	Miscellaneous: Bone	Unmodified rock (limestone)	Historical glass	Burned limestone	Burned earth
Level 1	0-10	3						6		1	
Level 2	10-20	4		1				2	1	1	
Level 3	20-30	1				1					
Level 4	30-40	1					2	1			
Level 5	40-50						1				1
Level 6	50-60	11	1					1			
Level 7	60-70	5			1						
Level 8	70-80	9					3	1			
Level 9	80-90	5					5			1	
Level 10	90-100	4[a]			1[a]						
Level 11	100-110	1[a]									
Level 12	110-120										
Level 13	120-130										
TOTALS		44	1	1	2	1	11	11	1	3	1

[a] recovered in Feature 2

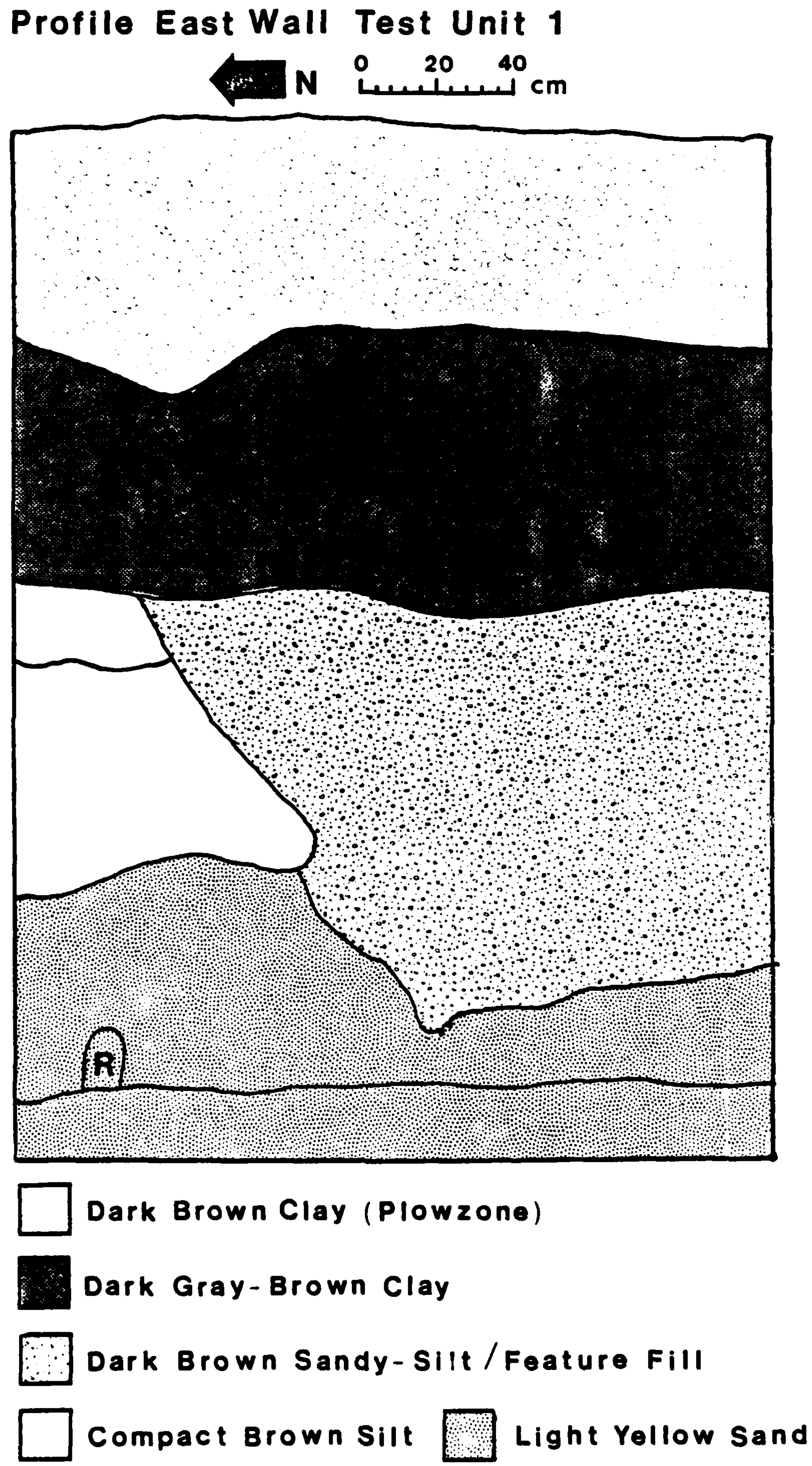


Figure 17. Profile of east wall of Test Unit 1.

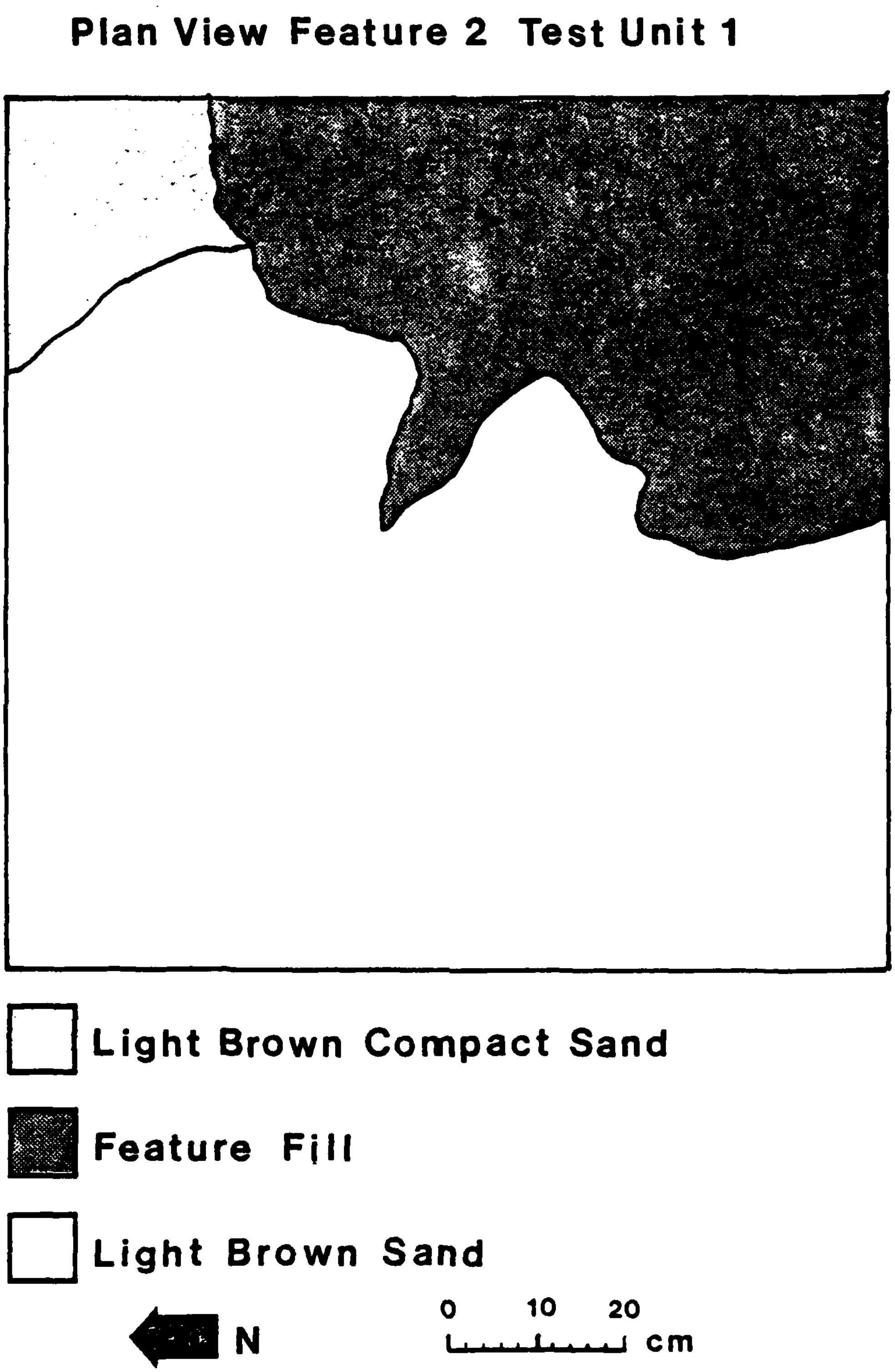


Figure 18. Plan view of Feature 2, Test Unit 1.

Test Unit 2

This 1 m^2 unit was located approximately 23 m southeast of the washout (Figure 9). The unit was excavated to a depth of 30 cm. Poor weather made further excavation virtually impossible, since the unit was filled with water. The first 10 cm of the unit consisted of silty sand and sand. These sediments probably were deposited by the floodwaters that caused the blowout of the sewage-lagoon levee. From 10-23 cm the sediments consisted of dark brown silty clay; at 23 cm the soil changed to a brown silty loam. A summary of artifacts recovered in the unit is presented in Table 14. No diagnostic artifacts were recovered from the unit.

Test Unit 3

This 1 m^2 unit was located 30 m southeast of the washout (Figure 9). The soil in the first 30 cm consisted of dark brown silty clay. Due to excessive rain and snow, the soil was quite plastic and of such consistency that it would not go through a ¼-inch hardware-cloth screen. Thus, the first 30 cm (i.e., the plow zone) was shoveled out. The 30-40-cm level was troweled and screened. At 35 cm the clay ended and the excavators encountered a silty sandy loam with clay mottling. The unit was excavated to a depth of 50 cm.

A summary of artifacts recovered is presented in Table 15. Diagnostic artifacts recovered include two _Cahokia Cordmarked_ body sherds and four _Mississippi Plain_ rim sherds. A description of the rim sherds follows.

Table 14. Material Recovered from Levels in Test Unit 2

Level	Artifact class: Ceramic	Debitage		Miscellaneous					
	Undecorated bodysherd	Interior flake	Biface thinning/ resharpening flake	Fire-cracked rock	Unmodified rock (limestone)	Unmodified rock (sandstone)	Unmodified rock (chert)	Historical slag	Total
Surface	1								1
Level 1 0-10 cm	8	4	2	39					53
Level 2 10-20 cm	12	2			5		1	3	23
Level 3 20-30 cm	4		1		1	1	3		10
TOTALS	25	6	3	39	6	1	4	3	87

Table 15. Material Recovered from Levels in Test Unit 3

Artifact class	Level 1 0-10 cm	Level 2 10-30 cm	Level 3 30-40 cm	Level 4 40-50 cm	Total
Ceramics:					
Undecorated bodysherd	2		29	30	61
Unidentified rim fragment			1		1
Cahokia Cordmarked bodysherd			3	1	4
Debitage:					
Core (polyhedral)			1		1
Shatter			1	4	5
Secondary decortication flake			1	3	4
Interior flake	1		3	6	10
Biface thinning/ resharpening flake			4	5[a]	9
Basalt flake			1		1
Retouched flake		1	1		2
Miscellaneous:					
Unmodified rock (limestone)			1	2	3
Unmodified rock (sandstone)			1	1	2
Unmodified rock	17			2	19
Groundstone		1	1		2
Bone			1	3	4
Tooth				1	1
TOTALS	20	2	49	58	129

Specimen 35-5-1--vertical rim, medium-sized temper (Figure 19 a).

Specimen 37-6-2--flared rim, thickened lip, medium-sized temper (Figure 19 b).

Specimen 37-6-1--flared rim, rolled lip, medium-sized temper (Figure 19 c).

Specimen 36-4--indeterminate rim form, thickened lip, medium-sized temper (Figure 19 d).

Test Unit 4

This 1 m^2 unit was located 58 m southeast of the washout (Figure 9). The unit was excavated to a depth of 40 cm. The first 10 cm was screened, but the next 20 cm was shoveled out, primarily because of the same conditions that occurred in test unit 3. The artifacts recovered from this unit are listed in Table 16. A medial fragment of a biface was recovered from level 2. It appears that this artifact is of heat-treated Ste. Genevieve ("rootbeer") chert. The only diagnostic artifact recovered--(Specimen 33-1) a vertical rim with a rolled lip from a Mississippi Plain vessel--also is from level 2 (Figure 19 e).

Profile A

This profile, located in the western margin of the washout, consisted of five adjacent 2 m^2 units separated by balks (Figure 9); the northernmost two were excavated as a single unit below the plow zone (i.e., below 30 cm b.s.). All soil was screened through ¼-inch hardware cloth. The upper 60-70 cm of soil was a tan silty sand, and the remaining 20-50 cm was a tan/yellow silty sand with clay mottling. Our discussion of these units

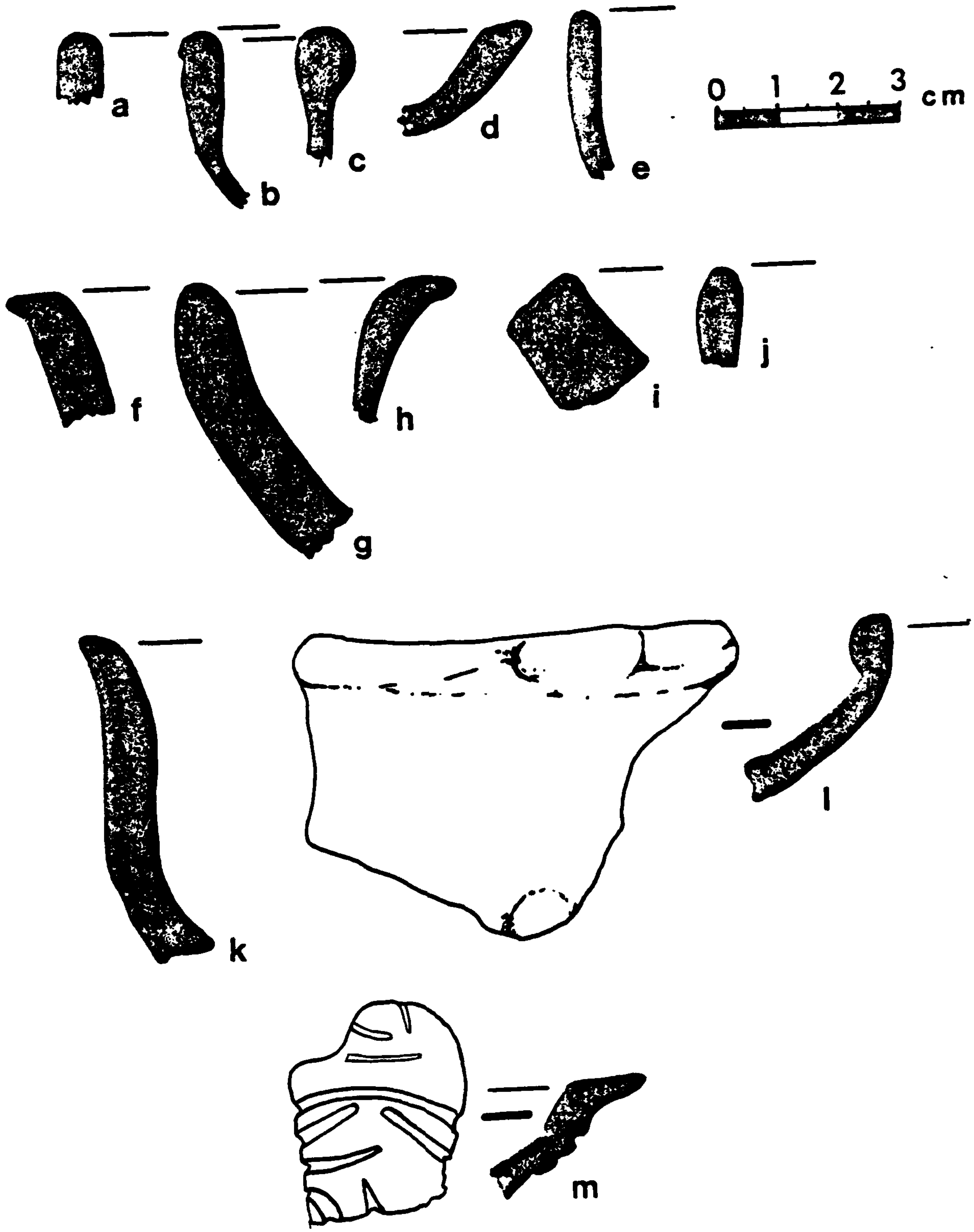


Figure 19. Rim profiles and decorated rims from Test Unit 3 (a-d), Test Unit 4 (e), and Profile A overburden (f-m), 23STG158.

Table 16. Material Recovered from Levels in Test Unit 4

Artifact class	Level 1 0-30 cm	Level Level 2 30-40 cm	Total
Ceramic:			
Undecorated bodysherd	2	6	8
Rimsherd		1	1
Debitage:			
Shatter	1		1
Interior flake	2	2	4
Biface thinning/resharpening flake	2	2	4
Miscellaneous:			
Unmodified rock (cobble)	1	1	2
Unmodified rock (limestone)	1	2	3
Unmodified rock (quartz)		1	1
Unmodified rock (sandstone)		1	1
Burned limestone	1		1
Bone	1	9	10
Biface fragment		1	1
Modern glass		1	1
TOTALS	11	27	38

begins with the overburden of sand and silt deposited by the flood, and is followed by an examination of cultural remains from each of the five units.

The term "overburden" is used to describe a shallow (i.e., less than 10 cm in thickness) deposit of sediments that were left by the winter floodwaters and which covered the slumped walls of the washout. A summary of artifacts recovered is presented in Table 17. Many diagnostic artifacts, both prehistoric and historical, were recovered from that disturbed context. These are discussed below.

Specimen 2-1 Mississippi Plain--indeterminate rim with an extruded lip, fine temper (Figure 19 f).

Specimen 2-2 Salt Pan--rim fragment, medium-sized temper (Figure 19 g).

Specimen 2-3 Mississippi Plain--indeterminate rim, extruded lip, medium-sized temper (Figure 19 h).

Specimen 2-4 Salt Pan--rim fragment, coarse temper (Figure 19 i).

Specimen 2-5 Mississippi Plain--vertical rim, medium-sized temper (Figure 19 j).

Specimen 2-7 Mississippi Plain--vertical rim, extruded lip, medium-sized temper (Figure 19 k).

Specimen 2-6 Mississippi Plain--flared rim, thickened lip, handled, coarse temper (Figure 19 l).

Specimen 2-8 Incised plate rim--medium-sized temper (Figure 19 m and Plate IX a).

Specimen 2-10 Mississippi Red Filmed--medium-sized temper (Plate IX b).

Specimen 2-11 French gun flint of transluscent tan chert (Plate IX c).

Profile A - Unit 1

Unit 1 was the southernmost 2 m^2 test unit in the western profile. The upper 4 cm consisted of a loose brown silt loam, and the following 6-10 cm was white to gray silty sand. Thus,

Table 17. Material Recovered in Profile A Overburden

Artifact class	Total
Prehistoric artifacts	
Ceramic:	
Undecorated ceramic bodysherd	44
Salt-pan bodysherd	6
Mississippi Red-filmed bodysherd	1
Cahokia Cordmarked bodysherd	3
Clay disc	1
Debitage:	
Primary decortication flake	6
Secondary decortication flake	13
Interior flake	50
Biface thinning/resharpening flake	9
Shatter	4
Polyhedral core[a]	5
Tabular core	1
Blade core	2
Retouched flake	3
Miscellaneous:	
Unmodified rock (sandstone)	7
Unmodified rock (limestone)	35
Unmodified rock (cobble)	11
Unmodified rock (chert[b])	9
Unmodified rock (quartzite)	2
Unmodified rock (granite)	1
Unmodified rock (coal)	29
Burned limestone	5
Bone	1
Historical artifacts	
Brown glazed stoneware	1
Marble	1
Clear bottle glass	6
Dark bottle glass	4
French gun flint	1

[a] Includes one core (2.9) of Mill Creek chert; [b] Does not include 218g of modern chert gravel.

the first 10-14 cm consisted primarily of overburden. Only three artifacts were recovered from the overburden: two pieces of unidentifiable animal bone and an undecorated medium-sized temper bodysherd (Table 18). They were recovered at depths of 91 cm and 89 cm, respectively.

Profile A - Unit 2

The sediments of this unit were the same as those in Unit 1. Nine artifacts were recovered, all between 107-127 cm, and all were located in the northwest corner of the unit (Table 18). Five undecorated bodysherds and two salt-pan sherds were recovered.

Profile A - Unit 3

The sediments in this unit were identical to those encountered in units 1 and 2. Five artifacts were recovered, including three undecorated bodysherds and one white-tailed-deer tooth fragment (Table 18). All were recovered at a depth of 110 cm.

The only other artifact recovered was a bodysherd of Mississippi Red-filmed ceramic. This sherd is 4 cm x 2.5 cm and is 5 mm thick. Both the exterior and interior surfaces are smoothed. The exterior surface is covered with a dark reddish-brown film, and the interior surface is covered with a bright orange-red film. The sherd was recovered from a depth of 88 cm.

Profile A - Unit 4

Sediments in this unit were similar to those in the previous three units. Only four artifacts were recovered during test excavations: two pieces of burned limestone and two deer bone

Table 18. Material Recovered from Subsurface Deposits in Units 1-5 of Profile A

Artifact class	Unit 1	2	3	4	5	Total
Ceramic:						
Undecorated bodysherd	1	5	3			9
Salt-pan bodysherd		2				2
Mississippi Red-filmed bodysherd			1			1
Miscellaneous:						
Bone	2	1	1	2		6
Burned limestone		1		2		3
Unmodified rock (sandstone)	1					1
Total	4	9	5	4	0	22

fragments (Table 18). All the artifacts were recovered at a depth of 83 cm b.s.

Profile A - Unit 5

The sediments encountered in this unit were similar to those in units 1-4. No artifacts were recovered below the overburden.

Profile B

This profile was started along the eastern side of the washout and consisted of two 2 m^2 units (Figure 9). The northernmost unit (Unit 1) was excavated to a depth of 120 cm, and the other unit (Unit 2) was excavated only to a depth of 70 cm. Both units were troweled and screened. A radiocarbon assay of 530 $\pm$ 50 B.P. (Beta-8970) was obtained from a sample of carbonized hickory nut shell recovered in Unit 1.

Profile B - Unit 1

This unit was excavated to a depth of 120 cm (Figure 9). The upper 10 cm consisted of dark, brown, plastic, silty clay. The next 10-15 cm consisted of a dark brown, humic, silty loam. The plow zone ended between 10-30 cm (figures 20 and 21). From 20-30 cm to 50 cm the soil consisted of a dark sandy soil that contained numerous artifacts and which appeared to be a well-defined pit or midden soil (Feature 1). Feature 1 extended to a maximum depth of 90 cm (figures 20 and 21). The remaining levels consisted of a light tan-buff silty sand and mottled tan-buff silty sand (figures 20 and 21). Cultural material was not recovered below 95 cm. A summary of artifacts recovered

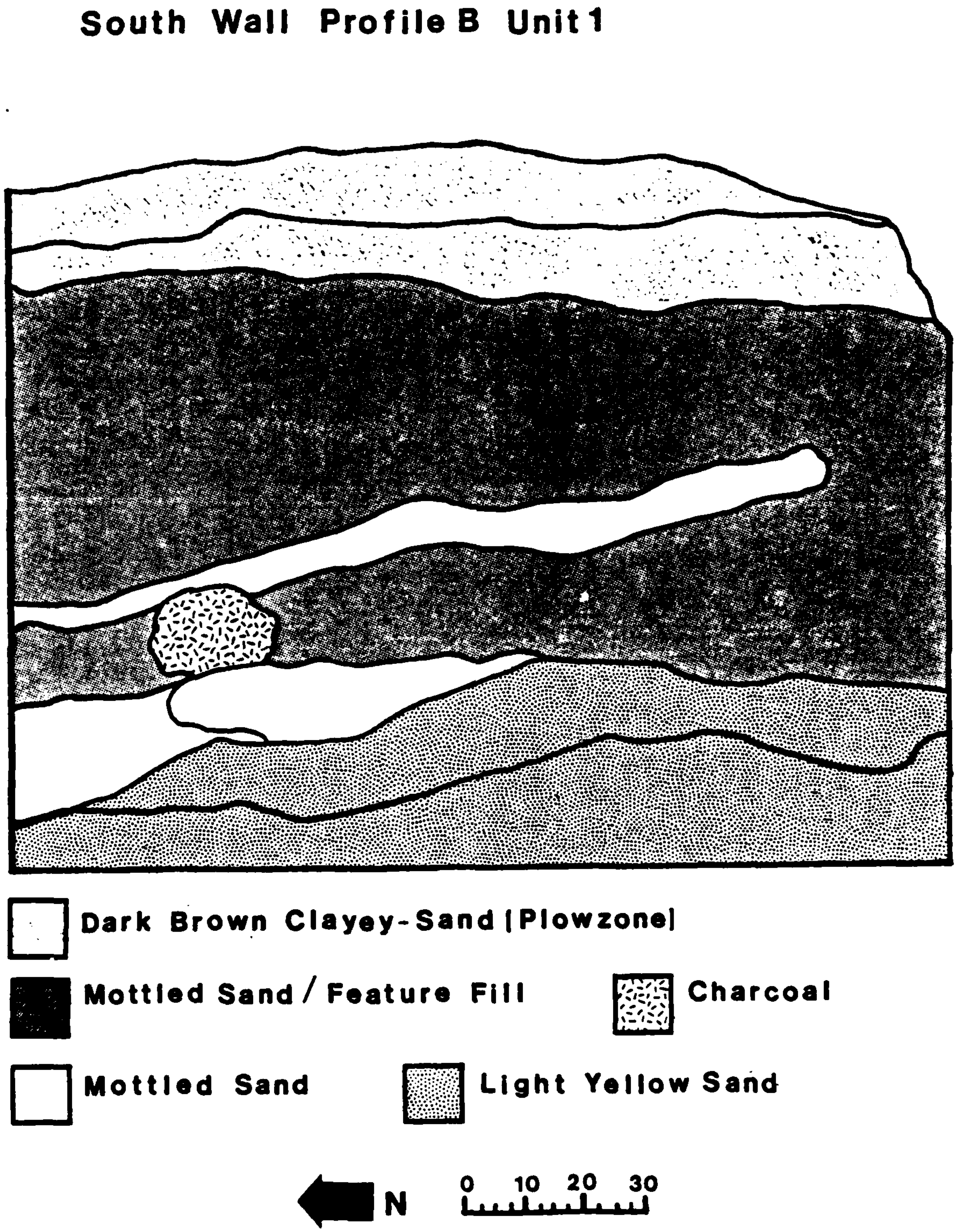


Figure 20. Profile of south wall, Unit 1, profile B.

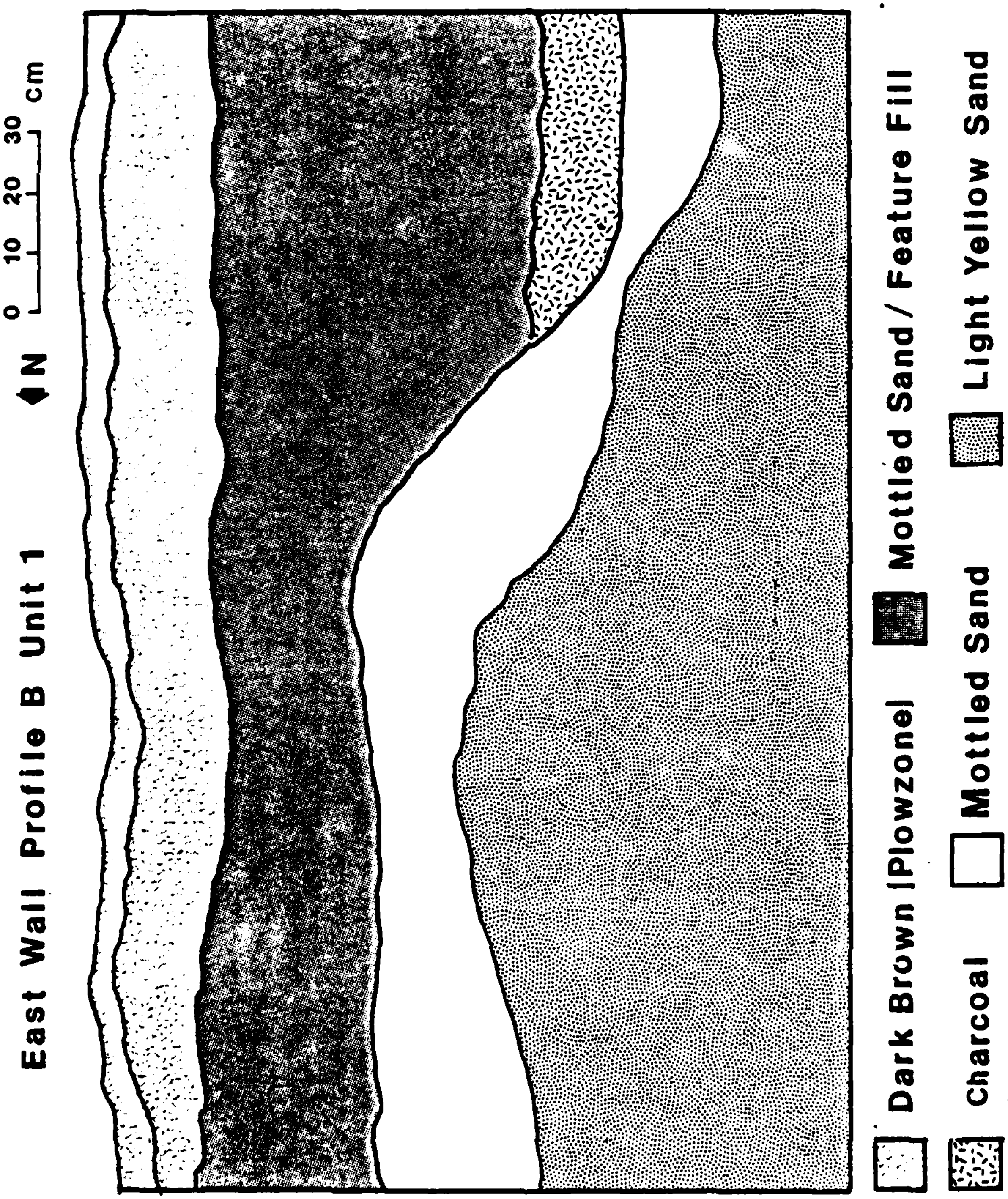


Figure 21. Profile of east wall, Unit 1, profile B.

is presented in Table 19. Diagnostic artifacts and tools are discussed below.

Specimen 8-9 Wickliffe Incised--bodysherd, tan, medium temper (Figure 22 a).

Specimen 8-31 Groundstone-tool fragment, one surface used for grinding and another as an abrader, sandstone.

Specimen 8-72 Mississippi Plain--curved rim, extruded lip, medium-sized temper, burnished (Figure 22 b).

Specimen 8-59 Groundstone tool fragment, granite.

Specimen 8-52 Medial fragment of a biface, white chert, heat treated.

Profile B - Unit 2

This unit was excavated to a depth of 70 cm. The upper 10 cm consisted of a dark brown silty clay. The next 10-15 cm consisted of a dark brown, sandy silt loam. The next 4-45 cm (i.e., from 20 to 65 cm) consisted primarily of a mottled sandy soil that included an area of dark sandy soil. This darker soil included large quantities of charcoal and appeared to be the southern extension of Feature 1. At approximately 55 cm the edge of Feature 1 could be seen quite clearly. The remainder of the deposit consisted mainly of pit fill or midden soil. The artifacts recovered are summarized in Table 20. Several diagnostic artifacts, including rimsherds and decorated body sherds, were recovered from Unit 2; these are discussed below.

Specimen 27-5 Mississippi Plain--vertical rim, extruded lip, medium-sized temper (Figure 22 c).

Specimen 27-41 Mississippi Plain--flared rim, medium-sized temper (Figure 22 d).

Specimen 27-103 Mississippi Plain--plate fragment, medium-sized temper (Figure 22 e).

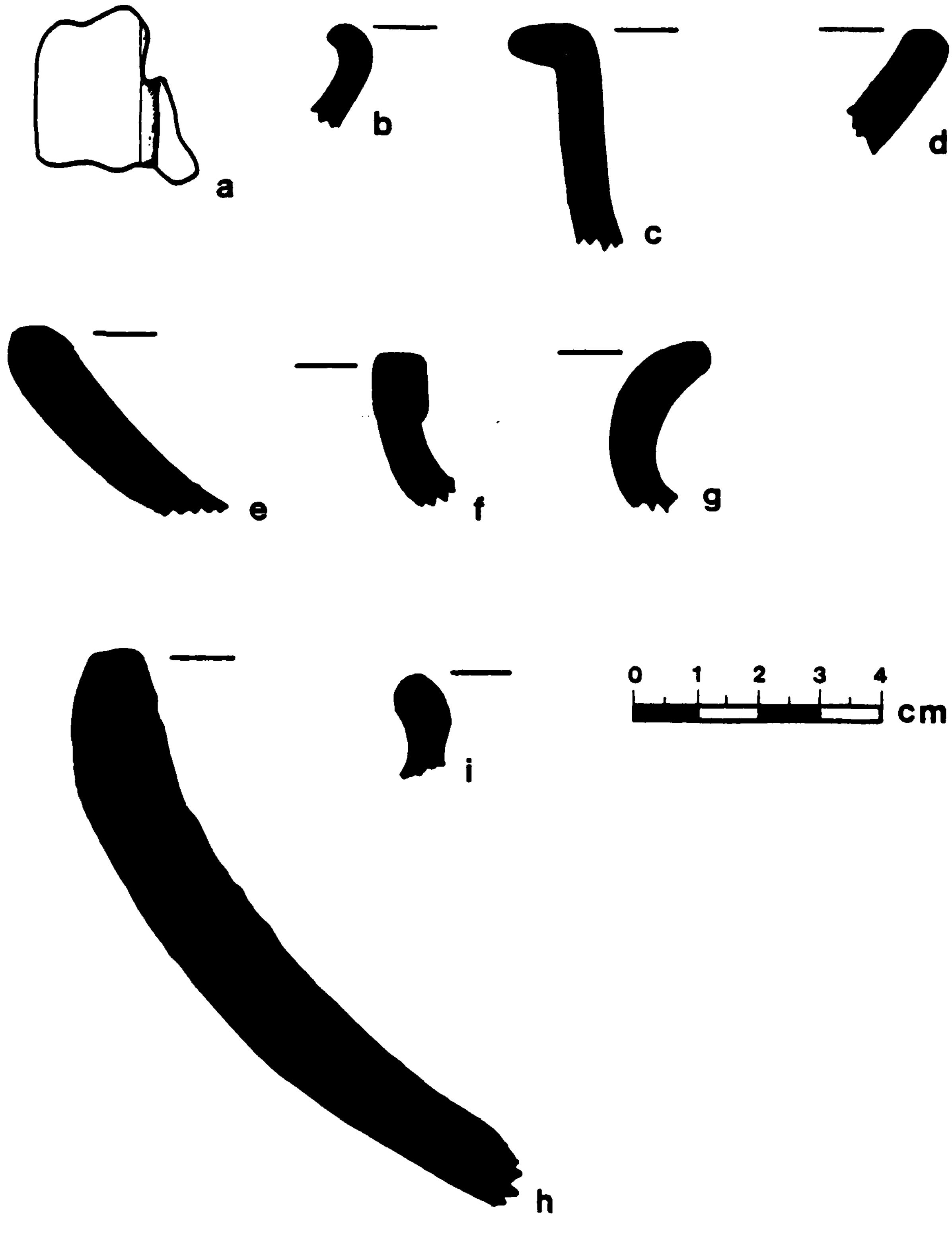


Figure 22. Decorated bodysherd and rim profiles from Unit 1, profile B (a-b), and Unit 2, profile B (c-i).

Table 19. Material Recovered from Profile B, Unit 1

Artifact class	Total
Ceramic:	
Undecorated bodysherd	20
Wickliffe sherd	1
Mississippi rimsherd	1
Salt-pan sherd	3
Unidentifiable fragment	1
Debitage:	
Tabular core	1
Secondary decortication flake	4
Interior flake	7
Biface thinning/resharpening flake	4
Shatter	4
Miscellaneous:	
Burned limestone	3
Unmodified rock (granite)	1
Unmodified rock (cobble)	6
Unmodified rock (sandstone)	2
Bone	2
Groundstone tool	1
TOTAL	61

Table 20. Material Recovered from Levels in Profile B, Unit 2

Depth (cm b.s.) / Artifact class[a]	Debitage: Core	Shatter	Primary decortication flake	Secondary decortication flake	Interior flake	Biface thinning/ resharpening flake	Miscellaneous: Unmodified rock (sandstone)	Unmodified rock (river cobble)	Burned limestone	Burned earth	Undecorated bodysherd	Shell fragment	Bone		TOTAL
0-30	2				4	2	1				2				11
30-35											1				1
35-40								1			7				8
40-45		5			4	1			1		12				23
45-50					2			1	1		9				13
50-55	1			7	9		1	5	2	1	11	1			38
50-60											3				3
60-70			1	2			4		6	4	28		1		46
TOTAL	3	5	1	9	19	3	6	7	10	5	73	1	1		143

[a] Does not include rimsherds and decorated bodysherds.

Specimen 27-104	Mississippi Plain--flared rim, thickened lip, medium-sized temper (Figure 22 f).
Specimen 27-105	Mississippi Plain--flared rim, rolled lip, medium-sized temper (Figure 22 g).
Specimen 27-106	Wells Incised--plate fragment, fine temper (Plate IX d).
Specimen 27-107	Fabric Impressed--rim fragment, coarse temper (Figure 22 h, Plate IX e).
Specimen 27-111-1	Mississippi Plain--flared rim, rolled lip, medium-sized temper (Figure 22 i).
Specimen 27-110-1	Powell Plain--body sherd, gray in color, fine temper.
Specimen 27-110-2	Fabric Impressed--body sherd, tan coarse temper.

Balk A

This balk was located between units 1 and 2 in profile B (Figure 9). It collapsed after a rainstorm, at which time the matrix was screened. Artifacts recovered are summarized in Table 21. Only one diagnostic artifact was recovered--a flared rim with a thickened lip from a Mississippi Plain vessel.

Table 21. Material Recovered from Balk A between Units 1 and 2, Profile B

Artifact class	Total
Debitage:	
Shatter	4
Primary decortication flake	1
Secondary decortication flake	2
Interior flake	3
Ceramic:	
Undecorated bodysherd	20
Salt-pan bodysherd	2
Miscellaneous:	
Unmodified rock (cobble)	6
Burned limestone	5
Burned earth	1
Mussel shell fragment	2
TOTAL	46

Scraper Cuts

Five cuts were made using a tractor equipped with a blade. They were located at the southeastern portion of the site and were cut perpendicular to the axis of the washout (Figure 9). Approximately 10 cm of earth was removed by the blade with each pass. Scraped areas were at least 50 cm deep. No artifacts were recovered from cuts 1 and 4. Artifacts recovered from this operation are discussed below.

Scraper Cut 2

This cut was 70 cm deep. No discernible cultural features were encountered. Artifacts recovered from this cut are listed in Table 22. Temporally diagnostic artifacts recovered include the following:

Specimen 40-1--Mississippi Plain, flared rim with rolled lip, coarse temper (Figure 23 a).

Specimen 40-2--salt pan rimsherd, coarse temper, tan (Figure 23 b).

Specimen 40-4--salt pan rimsherd, coarse temper, tan (Figure 23 c).

Speciment 40-6--Wickliffe Incised, bodysherd, medium-sized temper, tan (Figure 23 d).

Scraper Cut 3

This cut was approximately 75 cm deep. Again, no cultural features were encountered. Artifacts recovered from the area are listed in Table 22. Only one temporally diagnostic artifact (Specimen 37-1)--a salt pan rimsherd (Figure 23 e)--was found in the stripped area. However, a concentration of artifacts,

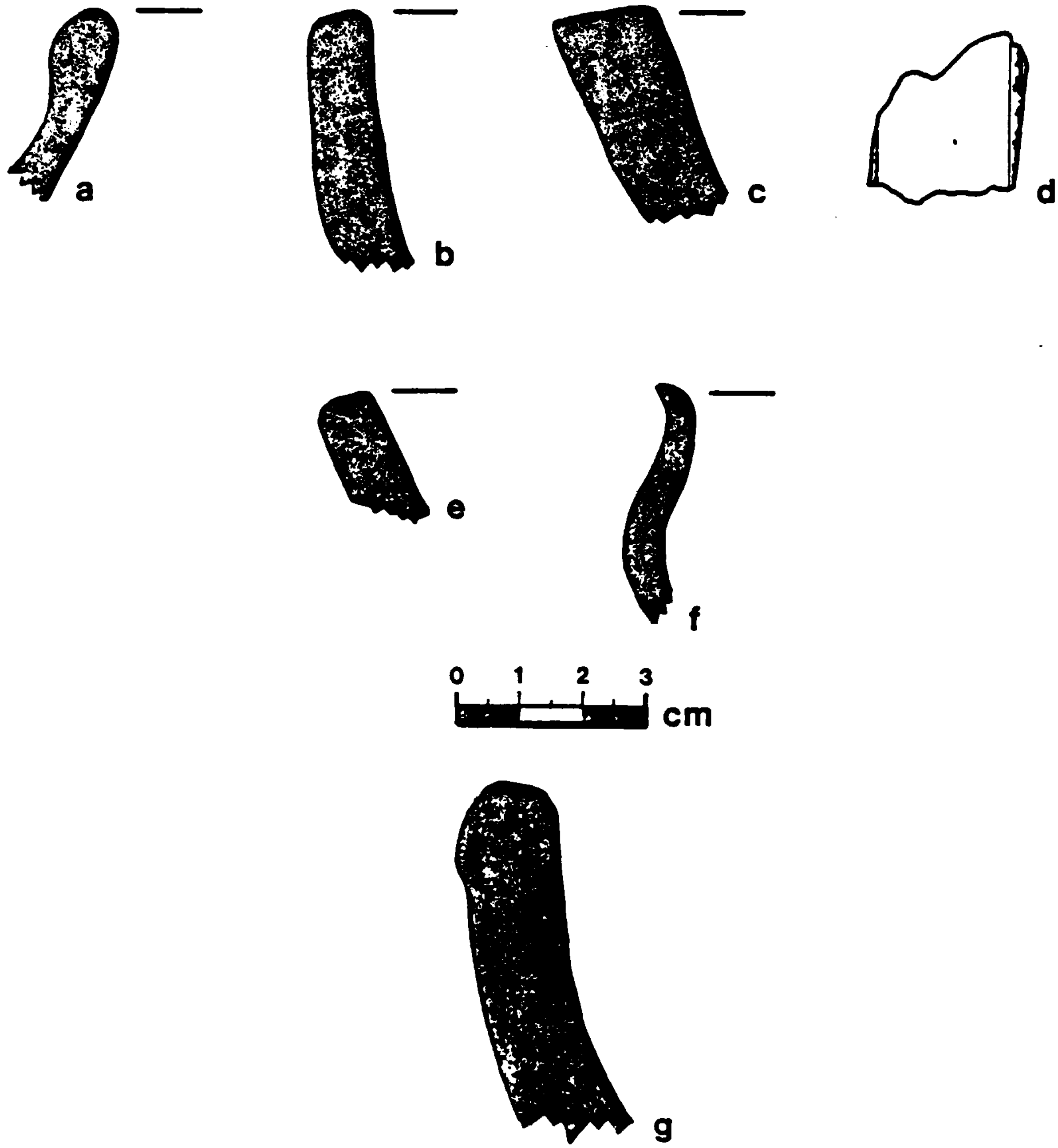


Figure 23. Rim profiles and decorated bodysherd from scraper cuts 2 and 3 (a-f) and backhoe area 2 (g).

Table 22. Material Recovered from Scraper Cuts 2 and 3

Artifact class	Cut #2	Cut #3
Ceramic:		
Undecorated bodysherd	8	10
Salt-pan bodysherd	7	
Debitage:		
Core	1	
Shatter		1
Secondary decortication flake	1	1
Interior flake	1	
Miscellaneous		
Unmodified rock (cobble)	1	
Burned limestone	4	13
Bone	2	1
Total	25	26

including fragments of burned limestone, was discovered in the south wall of the cut. One diagnostic artifact was recovered--a Mississippi Plain rim with an extruded lip (Figure 23 f).

Scraper Cut 5

This cut passed through an area of midden/feature soil that contained several sherds of Wickliffe Incised pottery (Plate II b). No other artifacts were recovered. The cultural material probably was associated with the southernmost portion of Feature 1.

Backhoe Areas

Two areas, one to the southeast of the site and the other adjacent to profile B, were cleared by a backhoe to determine the nature of subsurface cultural deposits.

Backhoe Area 1

Area 1 was located just southeast of test unit 4 (Figure 9). No artifacts were recovered during excavation of the area. However, excavations revealed what appeared to be a 10-15 cm-thick zone of cultural deposits (i.e., possible midden soil) below the plow zone and above sterile sand; this corresponds to what was seen in test units 3 and 4. No cultural features were noted. Finally, a trench approximately 8 m deep and 5 m long was excavated in the area. The walls were examined for buried cultural deposits; none was located.

Backhoe Area 2

Area 2 was located adjacent to profile B (Figure 9). Excavations were stopped at 40-45 cm, when possible cultural

deposits were encountered. The eastern and southern portions of Feature 1 were uncovered. In addition, several dark stains of varying size were also uncovered to the east of profile B. Unfortunately, extensive rain, followed by a deep freeze, precluded further work being carried out.

Only a few (n = 5) artifacts were recovered in the area of Feature 1: a Mississippi Plain bodysherd, a piece of burned limestone, two salt-pan bodysherds, and one salt-pan rimsherd (Figure 23 g).

CHAPTER 5: Faunal Remains[1]

Faunal remains were recovered during the surface collection, in profile B-unit 1, test units 1, 3, and 4 and in scraper cut 2. Only three mammalian taxa are represented--*Odocoileus* (deer) spp., *Cervis canadensis* (elk), and *Procyon lotor* (raccoon)--and only two taxa of fish--*Amia calva* (bowfin) and *Lepisosteus* spp. (gar). The faunal remains are summarized in Table 23.

While the faunal data are not overwhelming in either their diversity or number, they are comparable in kind to what has been found at other Mississippian sites in the Ste. Genevieve locality and in the American Bottom. The presence of deer and raccoon at the Bauman site is typical of most Mississippian sites, including 23STG100 and those in the American Bottom (Kelly 1979; Kelly and Cross 1984). The remains of fish indicate the probable exploitation of backwater sloughs, lakes, tributary streams, and slackwater areas of the Ste. Genevieve flood plain.

Unfortunately, the data do not allow us to draw any significant conclusions about patterns of animal exploitation or the season during which the site was occupied. The relative abundance of deer remains in the sample suggests that the site was occupied during the fall/winter--the prime season for hunting deer (see Styles 1981; Bozell and Warren 1982).

[1] All specimens were identified by Robert E. Warren.

Table 23. Faunal Remains from the Bauman Site

Provenience	Taxon	Element	Side	Portion
Surface (570)	*Odocoileus* spp.	radius	rt.	proximal
(283)	*Odocoileus* spp.	humerus	rt.	distal
(283)	unidentifiable mammal	-	-	-
(283)	cf. *Odocoileus* spp.	tibia	rt.	distal
(566)	*Odocoileus* spp.	tibia	rt.	distal
(197)	*Odocoileus* spp.	$M^{\underline{1,2 \text{ or } 3}}$	lt.	complete
(47)	unidentifiable mammal			
(49)	unidentifiable mammal	$M^{\underline{1,2, \text{ or } 3}}$	rt.	complete
(12)	unidentifiable mammal	-	-	-
(637)	*Odocoileus* spp.	$M_{\overline{3}}$	rt.	complete
(153)	*Amia calva*	maxilla	rt.	complete
(153)	*Amia calva*	ectopterygoid	lt.	complete
(153)	*Amia calva*	hyomandibular	rt.	complete
(153)	*Amia calva*	articular	rt.	complete
(154)	*Amia calva*	dorsal postorbital	lt.	complete
(155)	*Amia calva*	ceratohyal	rt.	complete
(156)	*Amia calva*	parietal	rt.	complete
(157)	unidentifiable fish	interoperculum	lt.	complete
(137)	*Lepisosteus* spp.	frontal	let.	complete
(82)	unidentified fish	operculum	rt.	complete
(82)	unidentified fish	-	-	-
Test unit 1, L4	unidentifiable mammal	-	-	-
Test unit 1, L8	*Odocoileus* spp.	metapodial	-	distal
Test unit 1, L8	unidentifiable mammal (2)	-	-	-
Test unit 3, L2	unidentifiable mammal	-	-	-
Test unit 3, L4	unidentifiable mammal	-	-	-
Test unit 3, L4	cf. *Procyon lotor*	$M_{\overline{2}}$	rt.	anterior
Test unit 4, L1	cf. *Cervis canadensis*	scapula	rt.	frag.
Test unit 4, L2	unidentifiable mammal	-	-	-
Test unit 4, L2	large mammal	vetrebral	-	-
Profile B/Unit 1	*Odocioleus* spp.	metatarsal	lt.	proximal
Profile B/Unit 1	unidentifiable mammal	-	-	-

CHAPTER 6: FLORAL REMAINS

An analysis of carbonized plant macro- and micro-remains produced important data relative to the role of plants in the prehistoric economy of the Bauman site inhabitants. The discussion that follows presents both a description of the data and an interpretation of the results. However, a brief description of the methods and techniques used in the analysis is presented first.

Analytical Methods and Techniques

Each flotation sample was floated by hand, and the remaining material separated into > 2 mm and < 2 mm fractions. All seeds were sorted from both fractions, but wood charcoal and carbonized nutshell were sorted for identification from the > 2.00 fraction. An American Optical Microstar stereoscopic microscope, with a magnification range of 7-45x was used to identify specimens.

Identification was made through comparison of archaeological material to known carbonized material from the laboratory's herbarium collections, and through reference to published identification manuals (e.g., Martin and Barkley 1961; Panshin and de Zeeuw 1970). In general, identification of seeds is accomplished by comparing morphological characteristics of archaeological specimens to those of known taxa. Species differences are not always apparent, and critical diagnostic differences (e.g., awns, outer seed coat, and color) often are lost during carbonization. Wood was identified by examination of the internal anatomy of the specimen and the use of a key developed

for carbonized wood identification. The arrangement of vessel elements, rays, and parenchyma tissue are some characteristics used in identification of archaeological specimens.

Summary of Herbaceous Plant Remains

Seeds from three taxa were identified in six samples; taxa represented include *Strophostyles* spp. (wild bean), *Vitis* spp. (grape), and *Zea mays* (maize). Table 24 presents the results by taxa and provenience. Each taxon is discussed briefly below.

Strophostyles spp.--Two cotyledons were identified in a sample from profile B-unit 2. Three species of *Strophostyles* are native to Missouri. *S. leiosperma* is found along river banks or in open woods; *S. helveola* and *S. umbellala* are found in dry sandy or upland soils, and in open woods. Fruits mature in the late summer or early fall. The cotyledons recovered from the Bauman site have lost their skins as a result of the carbonization process. In addition, shrinkage of the cotyledons also has taken place. Thus, the necessary traits needed to make a species-level identification are absent.

Wild bean cotyledons and intact beans, have been recovered from a number of archaeological sites in the Midwest. In the central Mississippi Valley they have been recovered from sites that range in date from the Late Archaic to the Late Mississippian cultural periods.

Vitis spp.--There are eight species and an additional six varieties of grape found in Missouri (Steyermark 1963). Species habitats range from moist bottoms to dry, rocky uplands. Fruits ripen in

the fall. The single seed recovered (Table 24) was corroded and damaged to such a degree that identification beyond genus is impossible.

Zea mays--Not only is the origin of maize still debated (see Ford 1983; Mangelsdorf 1974), but so too is its incorporation into late prehistoric economies (Asch and Asch 1982; Ford 1981; Yarnell 1983). However, the most recent data indicate maize did not play a role in the economies of prehistoric groups in the Midwest until the Late Woodland period (Johannessen 1983). This also appears to be the case in Missouri (Voigt 1982, 1983). Kernel fragments, glumes, rachis segments, and cupules, were recovered from the Bauman site (Table 24). This fragmentary evidence precludes any determination of row number or race.

Summary of Nutshell Remains

The carbonized nutshell assemblage from the Bauman site is similar to those from other Mississippian sites (e.g., Johannessen 1983, 1984; Smith 1978), with exception of the absence of black walnut, hazelnut and acorn remains. Identified remains include those of *Carya illinoensis* (pecan), *Carya* spp. (shagbark group), *Carya* spp. (kingnut group), and Juglandaceae (Table 24). Differentiations among *Carya* taxa were made employing Lopinot's (1983) criteria.

C. illinoensis (pecan) is found in moist, well-drained soils, usually on stable landforms in bottomland contexts. *C. laciniosa* (shellbark hickory) also favors moist bottomland as well as lower slope contexts. *C. glabra* (pignut hickory) is found in fertile upland contexts, while *C. ovata* (shagbark hickory) and *C. tomentosa* (mockernut hickory) occur in dry, upland areas.

Table 24. Floral Remains Identified from 23STG158

Provenience	Remains	Carbonized seeds:	Strophostyles spp. (bean) Vitis spp. (grape)	Zea mays (cupule) (maize)	Zea mays (glume)	Zea mays (kernel)	Zea mays (rachis)	Zea mays (rachis segment)	Carbonized nutshell:	Carya spp. (shellbark group)	Carya spp. (shagbark group)	Carya illinoensis (pecan)	Juglandaceae (hickory fam.)	Carbonized wood:	Platanus occidentalis (sycamore)	Ring porous	Salicaceae (Willow family)	Unidentifiable	Miscellaneous:	Arundinaria gigantea (cane)	Bone	Flake	Unmodified rock
Profile B/Unit 1										9	8	1											
Profile B/Unit 2	40-45 cm			2								2	16										
Profile B/Unit 2	50-53 cm			6	5		1	2		5	5	1											
Profile B/Unit 2	55-60 cm		2	1	1	7					22		49					4			1	1	
Profile B/Unit 2	50-60 cm									2	7		81							4	1		
Profile B/Unit 2	60-70 cm					2																	
Profile B/Unit 2	60-70 cm									11		3	212		2	1		1			3	1	1
Profile B/Unit 2	60-70 cm									16	8	9	126		1		2	1					
Profile B/Unit 2	60-70 cm		1	2	1						7	7	66			1		1			2	3	
Test Unit 1/F2	90-100 cm																						
Test Unit 1/F2	100-110 cm			1																			
Total			3	12	7	9	1	2		43	57	23	550		3	2	2	7		4	7	5	1

Our data indicate that bottomland and lower slope contexts, as well as upland area, were exploited to procure hickory nuts. However, we have no evidence to indicate either acorns or hazelnuts were a targeted resource. GLO-derived data indicate an abundance of oak and relatively common occurrence of hazelnut. While the number and distribution of individuals of these taxa at the time of the GLO surveys is not directly analogous to their numbers and distribution in the Mississippian period, oak trees and hazelnut shrubs probably were relatively abundant at the time the site was occupied. While hazelnut is not a common find at other Mississippian sites, carbonized acorn-shell remains are (Johannessen 1983, 1984).

The presence of *Carya* spp. and Juglandaceae remains indicate, at least, a late fall occupation of the site.

Summary of Carbonized Wood Remains

Carbonized wood specimens of *Platanus occidentalis* (American sycamore) and of Salicaceae (willow family) were identified in samples from the site. These taxa occur along the main channel, slough, oxbow lakes, marshes, and creeks in the Mississippi flood plain. These taxa apparently were exploited extensively by Mississippian groups, and evidenced in the abundant number in which they have been recovered from other Mississippian sites (Johannessen 1982, 1984).

DISCUSSION

While the plant assemblage is not exceptionally diverse, it does include important indicators relative to the character of food production and procurement by the inhabitants of the Bauman site. Cultivation of a tropical domesticate (i.e., maize) and collection of native wild foods (i.e., wild bean, grape, and hickory nut) appear to have been important components of prehistoric economies during the Mississippian period. Data concerning procurement of wood are insufficient for assessing any strategies of taxa selection.

The data suggest an early-late fall occupation of the site. Furthermore, while these data exhibit some similarities with those from other sites, there are striking dissimilarities with data from recently excavated sites in the region (see Johannessen 1983, 1984). Most obvious among these differences is the absence of native cultigens in the assemblage. _Iva_, maygrass, knotweed, and goosefoot have been recovered in significant quantities from Mississippian sites in Illinois (Johannessen 1984), Missouri, and at Common Field. The Bauman assemblage is most similar to those from protohistoric and historic Osage and Missouri sites (Blake 1983; A. Hunter pers. comm.). In light of the radiocarbon date (530 $\pm$ 50 B.P.) it may be that the component tested is late Late Mississippian, and thus, the assemblage may represent a shift in the structure of Mississippian food production and procurement.

CHAPTER 7: SITE DISCUSSION

This chapter is divided into several parts to facilitate our discussion of site function, temporal and cultural affiliation of the site, and site significance. The following pages include discussions on dating of the site, cultural affiliation, subsistence, resource procurement, site activities, and site function.

TEMPORAL AND CULTURAL AFFILIATION

Two factors hinder our efforts to date the occupations at Bauman and to place the site into an established chronology for the central Mississippi River valley: significant damage to the site both by agricultural activities and by erosion caused by flooding of the Mississippi River, and an imperfect picture of the site's structure. However, sufficient data have been generated to allow us to judge the site's age and its place in existing chronologies of the region.

We rely on two kinds of data to determine the age of occupation of the site. First there are diagnostic ceramic types that establish a relative age for the site. Second, there is a single radiocarbon date from an intact subsurface cultural deposit.

Before applying the first criterion for determining the date and cultural affiliation, we review the chronology for the Mississippian period in the central Mississippi River valley. We use a chronology developed by Fowler and Hall (1975) and revised by Milner _et al._ (1984).

It is evident from the results of previous excavations of Mississippian sites in the central Mississippi River valley that the genesis

and development of the Mississippian tradition was quite complex and is not fully understood. However, we believe Fowler and Hall's (1975) partition of Mississippian development into phases is a useful device for determining the relative age of a particular Mississippian site or occupation.

The first phase of interest to us is the Stirling phase (A.D. 1050-1150). Ceramic assemblages of this phase are characterized by jar and bowl forms with angled, thickened or rolled rims (Milner et al. 1984:168). Ramey Incised, Powell Plain, plain salt pans and Mississippi Red-Filmed are the dominant ceramic types in these assemblages (Fowler and Hall 1975:5-6; Milner et al. 1984:168).

The next phase, the Moorehead phase (A.D. 1150-1250), is represented best by ceramic assemblages that include Wells Incised and Cahokia Corkmarked ceramic types; both appear during this phase. In addition, a new form--the plate--occurs for the first time (Fowler and Hall 1975:5-6; Milner et al. 1984:173-75). Powell Plain and Ramey Incised ceramic types all but disappear from ceramic assemblages by the end of this phase. Plain surfaces dominate, and black-slipped wares gain favor over red-slipped wares.

The final phase of Mississippian development--Sand Prairie (A.D. 1250-1450)--represents the decline of the period of Mississippian florescence. Ceramic assemblages from occupations dating to this phase are dominated by Fabric Impressed pans, Cahokia Cordmarked vessels, and Wells Incised plates. However, while these types dominate the assemblages of decorated sherds and vessels, assemblages including all the ceramics from a site usually are dominated by plain-surfaced vessels (Fowler and Hall 1975:8; Milner et al. 1984:177). For example, at Florence Street (Jackson and Emerson 1983:196) 70% of the ceramic

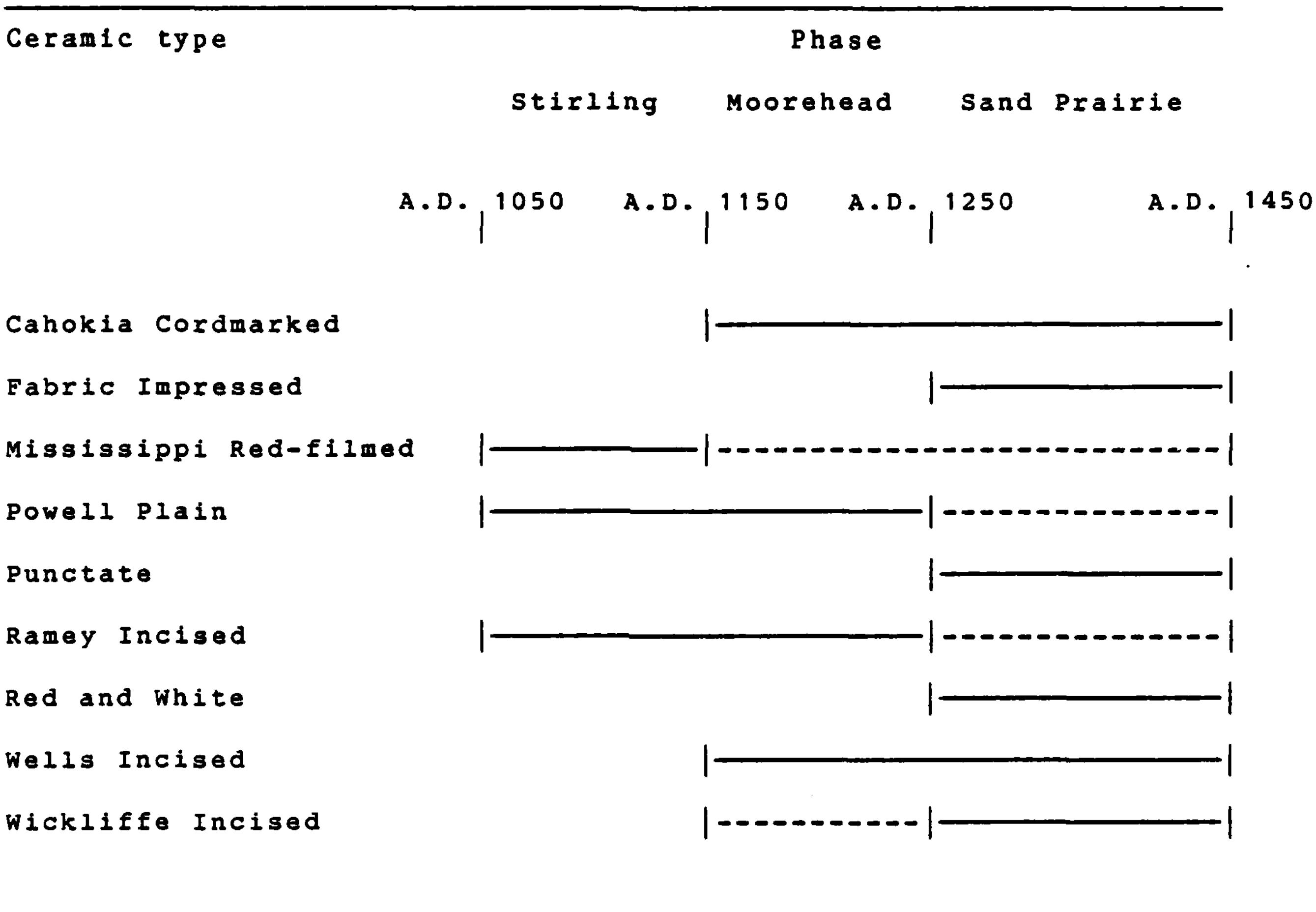
assemblage consists of plain sherds and vessels. In addition, vessels often have straight or angled rims with curved shoulders.

We probably can assign two other ceramic types not mentioned in the central Mississippi (i.e., Cahokia) chronology to this phase. The Red and White type appears to be a late Mississippian phenomenon (Phillips et al. 1951), as does the Punctate type; Punctate ceramic types date to A.D. 1400-1700 in Indiana (Green and Munson 1978:308).

The ceramic assemblage from Bauman has many things in common with other Mississippian sites in the region. Namely, it includes ceramic types common to virtually every Mississippian phase. However, a review of ceramic types recovered from Bauman and an examination of their relative importance in the assemblage provide a somewhat more concise picture of the place of the assemblage in the chronology.

The chronological "lifespan" of ceramic types recovered from Bauman, based on the revised chronology, is illustrated in Figure 24 . In Table 25, the frequency of occurrence for these types is summarized. The data indicate early ceramics (i.e., Mississippi Red-Filmed, Powell Plain, and Ramey Incised) dominate the surface ceramic assemblage (i.e., 60% of the total of all decorated sherds), but are relatively unimportant in the assemblage of excavated ceramics (20% of all decorated sherds). In addition, Mississippi Red-Filmed ceramics, while common in Stirling phase assemblages, also occur in both the Moorehead and the Sand Prairie phases. If we remove the Mississippi Red-Filmed ceramic type from the "early" group, the remaining

Figure 24. Time span of decorated ceramic types from the Bauman site.



[a] rank based on frequency of occurrence.

---------- present

———————— period of predominant use

Table 25. Summary of Diagnostic Ceramic Types from the Bauman Site

Ceramic type	Provenience		
	Surface[a]	Excavation	TOTAL
Cahokia Cordmarked	4/5	2	11
Fabric Impressed	1/2	3	6
Mississippi Red-filmed	3/18	2	23
Powell Plain	1/4	1	6
Punctate	1/0	0	1
Ramey Incised	1/0	0	1
Red and White	0/1	0	1
Wells Incised	1/2	2	5
Wickliffe Incised	0/1	2	3
TOTAL	45	12	57

[a] First number is the total from St. Louis District and Kapps surface collections; second number is the total from UMC surface collection.

"early" types represent only 4% of decorated sherds from the surface collections and 8% of decorated sherds from excavations. Thus, we believe the decorated ceramic assemblage from Bauman, and the overwhelming dominance of the entire ceramic assemblage by plain-surfaced sherds, indicate the occupations at Bauman can be assigned to either the Moorehead or the Sand Prairie phase. This would date the site to between A.D. 1150-1450.

The radiocarbon assay carried out on hickory nutshell from profile B-unit 2 produced a date of 530 ± 50 B.P. (Beta 8970) (A.D. 1420 ± 50). This date indicates that Feature 2 may represent a very late Mississippian component of Bauman. However, when this date is compared with those from Sand Prairie phase Mississippian sites in the American Bottom, and with dates from Common Field, its legitimacy is enhanced. For example, at Julien radiocarbon dates for the Sand Prairie occupation range from A.D. 1345 ± 75 to A.D. 1390 ± 75 (Milner 1984:44). Two radiocarbon assays were obtained on wood charcoal from Common Field; one produced a date of A.D. 1428 ± 60 (Beta 4997) and the other a date of A.D. 1218 ± 70 (Beta 4998). Thus, it appears that the date for Bauman is not out-of-line with dates from other Mississippian sites in either the locality or the region.

Bauman probably is a terminal Moorehead or Sand Prairie phase Mississippian site. In the following portions of this section we evaluate the implications of this assessment and develop an understanding of the role of Bauman in a Mississippian settlement-subsistence system.

SUBSISTENCE

Faunal data from Bauman indicate the site's inhabitants hunted deer and raccoon and made some use of aquatic resources (Table 23). It is not unimaginable that groups relied on the same kinds of faunal resources as other Mississippian groups in the region (see Kelly and Cross 1984). A variety of aquatic, terrestrial, and arboreal fauna probably were available and accessible to the inhabitants of the site.

While the floral assemblage exhibits some similarities with those from other Mississippian sites, it also exhibits some marked differences (Table 24). Most importantly, there are no remains of native cultigens in the sample. Since the advent of new and improved flotation techniques, remains of native cultigens have been recovered from almost every recently excavated Mississippian site (e.g., Gypsy Joint [Smith 1978]; Florence Street and Julien [Johannessen 1984]; and those in southeast Missouri [Cutler and Blake 1976]).

The assemblage includes seeds from wild bean and grape, as well as remains of maize. Each of these has been recovered at Mississippian sites in the region.

Nutshell remains include those of pecan and thick-shell hickories. These taxa undoubtedly occurred within walking distance of the site.

It appears from our data that the occupants of Bauman carried out a subsistence strategy that focused on the collection of wild plant foods (e.g., nuts and fruits), hunting of vertebrate fauna, and cultivation of maize.

RAW MATERIAL PROCUREMENT

In addition to obtaining food resources, other important resources--especially lithic material for the manufacture of stone tools--were procured. We have identified several chert types and lithic materials that were modified by the inhabitants of the site. These included Kaolin, Ste. Genevieve, Burlington, and Mill Creek cherts, as well as granite, basalt, and galena.

This assemblage of lithic raw material is similar to those from many other Mississippian sites in the American Bottom (Milner 1984). The single exception is the abundance of basalt artifacts and galena recovered from the site.

Two chert types appear to be local varieties--Burlington and Ste. Genevieve. Both are found in the bluffs and upland areas near the site. In addition, Ste. Genevieve "root-beer" chert has been recovered from other Mississippian sites in the American Bottom (Jackson and Emerson 1983; Milner 1984). Two other chert types--Kaolin and Mill Creek--are found in southwest Illinois (Spielbauer 1984). Kaolin is similar to chalcedony and is found in Union County, Illinois. Mill Creek chert is a buff-colored chert from the Warsaw-Salem formation of Union and Alexander counties, Illinois (Spielbauer 1984) and appears to have been favored as a raw material used in the production of digging tools (Milner 1984:67). This is the case at Bauman, though an adze of Mill Creek chert also was recovered from the site. Mill Creek and Kaolin cherts were traded throughout the Mississippi Valley (Morse and Morse 1983).

The granite used in the production of stone tools may have been obtained from either the St. Francois Mountains to the east from glacial erratics that occur in upland till deposits, or from eroded Pleistocene terraces along the Mississippi River. The source of basalt is the St. Francois Mountains to the east (Jack Ray, pers. comm.). Apparently, quarried rock was brought to Bauman, as evidenced by the large number of blanks recovered. Although some of the blanks were worked into finished stone tools (celts, axes, and adzes), it may be that unfinished bifaces were transported to other Mississippian sites in the region; basalt tools have been recovered from Mississippian sites in the American Bottom and in the lower Mississippi Valley.

The large cache of galena recovered from Bauman is one of the largest caches of this raw material ever recovered from Mississippian habitation contexts. Galena recovered at Mississippian sites in the American Bottom has been analyzed, and results indicate the mineral was brought from the lead deposits from around Potosi, Missouri, in the St. Francois Mountains (Milner 1984). Indeed, galena from this source has been recovered from archaeological sites throughout the southeastern and eastern United States. While the galena from Bauman has not been analyzed, we assume that the area near Potosi served as the source for our sample.

While we have identified a few chert types and some of the raw materials recovered at the site, we cannot ascertain how some were procured or whether some raw material was exchanged or traded with other Mississippian groups in the valley. It is apparent that raw materials from the St. Francois Mountains

were being transported from the source area to the Ste. Genevieve locality and to the American Bottom. In addition, raw materials (e.g., Kaolin and Mill Creek cherts) from outside the locality were brought into the Bauman site. The mechanisms of such events cannot be explained adequately using only the Bauman material. However, artifacts recovered from Bauman indicate that a small Mississippian settlement also could have been involved in the procurement and use of "exotic" raw materials, and possibly involved directly in intraregional exchange or trade networks.

SITE ACTIVITIES

An archaeological site once served as a locus of human activity, and consists of the patterned remains of certain sets of past human behavior. It consists of discarded artifacts, by-products of manufacturing, maintenance, or processing activities, cached artifacts, structures, and features. While these items have inherent meaning--in terms of their physical existence and archaeological context--each item also possesses a "systemic" identity, i.e., each can represent any of three levels of human behavior: individual, group or family, and community.

In an attempt to understand the systemic function of each artifact, the significance of their patterned relationships, as well as the role of the site in a particular settlement-subsistnece system, four analytical units are used to partition the kinds of human behavior that produced the entities present in the archaeological record: action, activity, activity class, and task. These represent the identifiable levels of human

behavior evidenced in the contexts and structure of a site. Each is discussed briefly below.

An _action_ is an individual event, i.e., a unit of behavior that takes on significance--for the archaeologist--when it is manifest as a patterned and recurrent phenomenon. For example, striking a flake from a core is an action.

An _activity_ is a set of recurrent human actions, e.g., flaking a piece of lithic raw material to produce a working edge is an activity. In other words, an activity is a set of actions that represents a means of achieving a specific immediate or anticipated goal (Reeder _et_ _al_. 1983:323). An activity often consists of a complex network of interrelated actions involved directly in, or which are ancillary to, a process. For example, making a working edge on a tool also involves other activities such as lithic procurement and transport and modification of the raw material to enhance tool production. Further examples of activities are presented in Table 26 .

The degree of specificity to which one can delimit the presence of an activity is conditioned by the kinds of material recovered, as well as by the kinds of data generated by analysis. When direct evidence of certain activities is not available, one must turn to _activity_ _classes_--sets of interrelated activities that, based on an evaluation of certain kinds of data (usually use-wear studies), reflect specific behaviors and which are inferred to have taken place at or near a site (see Reeder _et_ _al_. 1983:224) (Table 26).

The final analytical unit is a _task_, i.e., a set of activites organized in such a manner so as to successfully implement a strategy of resource procurement, exchange, or trade (Reeder

Table 26. Examples of Functional Classes and Inferred Activities

Functional class	Activity
Scraping	hideworking, bone- and wood-tool production
Grinding	hematite processing, plant-material processing, stone-tool manufacturing and maintenance
Hammering	stone-tool manufacturing and maintenance, quarrying for raw material, butchering
Chopping/adzing	butchering, tree felling, plant-material procurement and processing

et al. 1983:224). Remnants of activities associated with specific tasks should be manifest in the archaeological record as recurring sets of functionally dissimilar but activity-related artifacts and the occurrence of by-products of activities related to either procurement or processing of resources targeted for exploitation. For example, hunting is a task, and ethnographic data indicate many individual and group actions, as well as activities, are involved in the selection, location, procurement, and processing of faunal resources (see Lee 1968; Yellen 1977). Evidence in the archaeological record of faunal procurement and processing often consists of (a) the presence of components of tool-kits, e.g., cutting, scraping, sawing, and/or axing implements and (b) the presence of disarticulated and butchered vertebrate remains.

Using these analytical units in conjunction with other data, it is possible to determine the function of a site in a settlement-subsistence system. Basically, one must identify the kinds of functions and activity classes represented by use-wear patterns on stone and/or bone tools; spatial patterning of tools, classes of artifacts recovered at the site (including a determination of their absolute or relative age, their provenance, and their provenience); the kinds of natural resources exploited (including such things as lithic and food resources); and the relative complexity of a site's structure. In addition, certain ancillary studies should be carried out, e.g., paleoethnobotanical and faunal analyses, geomorphological studies, and various environmental analyses.

Our study of the archaeological data recovered from the site was structured to address most of the points mentioned above. A complete discussion of the range of activities carried out at the Bauman site by its inhabitants is beyond the scope of this report. However, in identifying key aspects of the kinds of past behavior that occurred at the site, we can develop a basic understanding of the systemic nature of the archaeological data and of the function of the site in a Mississippian settlement-subsistence system.

Use-wear analysis is critical to any effort aimed at determining the kinds of actions, activities, and tasks that were carried out by inhabitants of the site. In fact, use-wear analysis is the key factor in developing an accurate assessment of the kinds of human behavior that occurred at a site. The functions and functional classes (Table 27) serve as building blocks upon which a determination of site function is made.

On the basis of the use-wear study[1] we can identify some of the activities that were carried out at the site; these are listed in Table 27 . They indicate that a variety of domestic activities and tasks were undertaken by the site's inhabitants. Analysis of materials recovered in any future work could provide information about the spatial distribution of various activities and tasks, including differentiation among structures.

Based on the results of our analysis, Bauman served as a residential site. Residential sites are occupations from which task groups originate and where a variety of domestic and maintenance activities are carried out. Such sites are

[1] Performed by Robert L. Reeder

Table 27. Activity Classes Derived from Use-Wear Analysis of Stone Tools from the Bauman Site

Activity class	Function
Animal and plant procurement	projectile, hoeing
Animal and/or plant processing	cutting, scraping, adzing grinding, axing
Woodworking and/or boneworking	cutting, graving, chopping, adzing, chiseling, axing
Stone-tool manufacture and/or maintenance	hammering, grinding, abrading
Ceramic manufacture (temper preparation)	grinding, hammering

centrally located, i.e., they are located in physiographic contexts in close proximity to areas where economically important resources are abundant, available, and accessible. However, as we discuss below, a more precise determination can be made of the function of Bauman in a Mississippian settlement-subsistence system.

BAUMAN SITE FUNCTION

Fowler (1978:455-78) defines four "types" of Mississippian sites, including first-line settlements (e.g., Cahokia), second-line settlements (large sites with mounds), third-line settlements (sites with a single mound) and fourth-line settlements (sites without mounds). Recent work indicates that the latter can be divided into two subtypes: the farmstead and the hamlet. The former consists of 2-3 households with auxilliary features (e.g., smudge pits, wall trenches, and pits), while the latter consists of 8-15 structures with an artifact assemblage that often includes exotic material (Muller 1978:276-277). In all probability, Bauman is a farmstead; perhaps a satellite community of Common Field.

Such communities occur on ridges in the flood plains of major rivers and their larger tributary streams and range from 10-200 ha. in size (Muller 1978:277). In the American Bottom such sites occur only on higher, well-drained ridges that often are associated with point-bar complexes--especially Sand Prairie phase sites (Milner _et al_. 1984:173, 177, 185). Bauman appears to fit this locational pattern.

Recent archaeological research has yet to clarify the confusion surrounding the exact interrelationship between a satellite community and a larger Mississippian site. However, intrasite variability is better understood as a result of recent work. Importantly, it appears there also are "functional" differences among houses within farmsteads and hamlets.

Such sites usually have specialized structures or groups of structures with a shared production specialty (Prentice 1983; Prentice and Mehrer 1981). It appears that an economic system making use of "cottage industries" was the norm for Mississippian times. For example, responsibility for shell-bead manufacturing, galena-bead processing, and stone-tool production--among other activities--may have been discharged to different families or groups within a community. The presence of galena, basalt, and whelk shell columellae at Bauman indicates that the inhabitants of Bauman may have been involved in a variety of cottage industries. The presence of salt-pan fragments in the ceramic assemblage from the site also may represent another commodity that could have been processed at the site and then traded or exchanged with other Mississippian groups in the locality or in the central Mississippi valley.

In summary, we infer that Bauman may have been a satellite community of Common Field, but that important subsistence and economic activities were carried out at the site. Further work may indicate that Bauman was situated on an active channel of the Mississippi and that Common Field was located on an inactive slough or oxbow. In such a scenario, Bauman may have served as the "port" for Common Field--hence, the caches of raw materials.

SITE SIGNIFICANCE

Bauman is an important site based on the following criteria: there are intact subsurface deposits; the site type is unique to the locality; we have firm temporal and cultural contexts for occupations at the site; phase II research at the site produced an abundance of exotic lithic and mineral materials; there are important data relevant to obtaining a clearer picture of subsistence at smaller Mississippian communities; and finally, the site may produce data important to our attempts to understand more fully the nature of Mississippian chronology and settlement-subsistence systems. Each of these points is discussed briefly below.

The presence of undisturbed subsurface deposits in an area where modern agricultural techniques are practiced is rare. This is true especially when the deposits may contain features and structures. Common Field is the only other identified flood plain Mississippian site in the locality with documented subsurface deposits. While many diagnostic artifacts and different tool types were recovered during surface collections, analysis of the distribution of excavated artifacts indicates that significant subsurface deposits exist at the site. This distribution is presented graphically in Figure 25; artifact density increases with depth, with the greatest amount occurring below 50 cm. In profile A, artifacts were encountered only below 80 cm b.s.

Bauman is unique in another way; it is the only documented fourth-line settlement in the southern American Bottom or Ste. Genevieve locality. All other recorded Mississippian sites

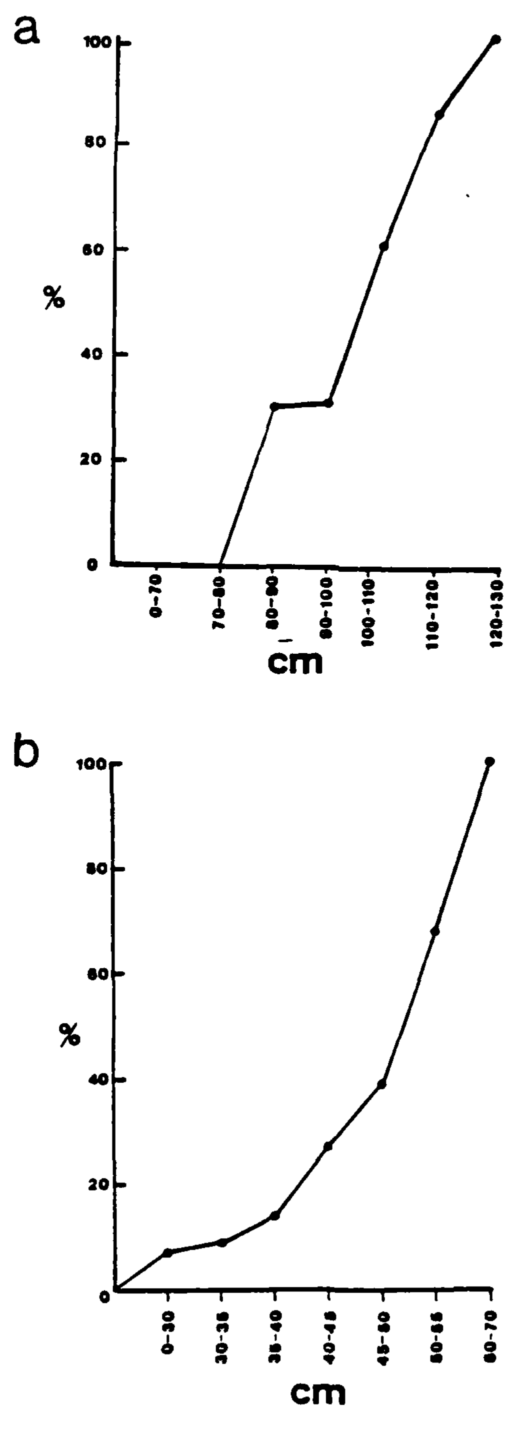


Figure 25. Cumulative graphs depicting artifact density by level in Unit 1, profile B (a), and Unit 2, profile B (b).

in the Mississippi River flood plain are second- or third-line communities. While a limited number of farmsteads and hamlets have been excavated in the American Bottom, they are in close proximity to Cahokia. In southeastern Missouri, farmsteads and hamlets have been excavated. However, Bauman is the only site of its type known in the area outside Cahokia's immediate sphere of influence and which appears to be affiliated with a major second-line settlement.

The ceramic assemblage and radiocarbon assay from Bauman indicate the possibility of obtaining a controlled and dateable ceramic assemblage. This would enhance our understanding of the chronological sequence for the Mississippi tradition in the areas distant from Cahokia. Since the ceramic assemblage from Bauman includes (a) ceramic types similar to those found at Cahokia and (b) other types that are found in southern Missouri and in Illinois, further excavations and radiocarbon dates would serve to tie together the Mississippian chronologies for the central and lower segments of the Mississippi River valley.

The presence of exotic materials, occurring in quantities at such a site, is unusual. This seems to indicate that there is a need to reevaluate concepts about the economic and social organization of small Mississippian sites. Or, on the other hand, Bauman may have served a unique function in the local Mississippian settlement-subsistence system. The presence of exotic raw materials could provide clues about transport, trade, and exchange.

RECOMMENDATIONS

Given the importance of the Bauman site both in a local a regional framework, we recommend that Bauman be nominated to the National Register of Historic Places. In addition, we strongly believe that a plan for preserving Bauman should be developed immediately. If this is not suitable, then we recommend that the U.S. Army Corps of Engineers (St. Louis District) immediately begin phase-III work on the remaining cultural deposits in the northeastern portion of the site. If this is not practical, we suggest certain steps be taken to ensure that the remaining cultural deposits at Bauman not be destroyed. These are outlined briefly below.

1. The site should be covered in such a manner so as to minimize future damage to the site from agricultural activities and future floods.

2. Cooperation of the landowners should be sought to ensure that access to the site is limited.

3. Heavy machinery should be kept away from the site, especially in the area of the washout and the northeast portion. Any infilling should take place with heavy equipment restricted to the northwest portion of the site.

4. The St. Louis District should seek the cooperation of the landowners in limiting damage to the site by agricultural activities.

5. Geomorphological studies should be carried out to determine the stability of the landform and its resistance to the forces of future floods.

References

Adams, R. M., F. Magre, and P. Munger

1941 Archaeological surface survey of Ste. Genevieve County, Missouri. _The Missouri Archaeologist_ 7:9-23.

Ahler, S. A.

1971 Projectile point form and function at Rodgers Shelter, Missouri. _Missouri Archaeological Society, Research Series_ No. 8.

1979 Functional analysis of nonobsidian chipped stone artifacts: Terms, variables, and quantification. In _Lithic use-wear analysis,_ edited by B. Hayden. New York: Academic Press. Pp. 301-28.

Asch, D. L., and N. B. Asch

1982 A chronology for the development of prehistoric horticulture in Westcentral Illinois. Paper presented at the 47th annual meeting of the society for American Archaeology, Minneapolis, Minnesota.

Asch, N. B., R. I. Ford, and D. L. Asch

1972 Paleoethnobotany of the Koster Site: The Archaic horizons. _Illinois State Museum, Reports of Investigations_ No. 24.

Bernabo, J. C.

1981 Quantitative estimates of temperature changes over the last 2700 years in Michigan based

on pollen data. Quaternary Research 15:143-59.

Bernabo, J. C., and T. Webb, III

1977 Changing patterns in the Holocene pollen record of northeastern North America. Quaternary Research 8:64-96.

Blake, L. W.

1983 Previous work on plant remains from 1 Missouri and 3 Osage sites. In Missouri-Osage cultural change project, edited by C. H. Chapman. Report submitted to National Endowment for the Humanities. Pp. 94-104.

Bourdo, E. A., Jr.

1956 A review of the General Land Office survey and of its use in quantitative studies of former forests. Ecology 37:754-68.

Bozell, J. R., and R. E. Warren

1982 Analysis of the vertebrate remains. In The Cannon Reservoir Human Ecology Project: An archeological study of cultural adaptations in the southern Prairie Peninsula, edited by M. J. O'Brien, R. E. Warren and D. E. Lewarch. New York: Academic Press. Pp. 171-95.

Brackenridge, H. M.

1814 Views of Louisiana, together with a journal of a voyage up the Missouri River, in 1811. Pittsburgh: Cramer, Spear and Eichbaum.

Bushnell, D. I., Jr.

1914 Archaeological investigations in Sainte Genevieve County, Missouri. Proceedings of the U.S. National Museum 46:641-68.

Butzer, K. W.

1977 Geomorphology of the lower Illinois Valle as a spatial-temporal context for the Koster Archaic site. Illinois State Museum, Reports of Investigations No. 34.

Chapman, C. H.

1980 The archaeology of Missouri, II. Columbia: University of Missouri Press.

Cottam, G.

1949 The phytosociology of an oak woods in southwestern Wisconsin. Ecology 30:271-87.

Cottam, G., and J. T. Curtis

1956 The use of distance measures in phytosociological sampling. Ecology 30:271-87.

Cotterell, B., and J. Kamminga

1979 The mechanics of flaking. In Lithic use-wear analysis, edited by B. Hayden. New York: Academic Press. Pp. 97-112.

Crocker, R. L.

1952 Soil genesis and pedogenic factors. Quarterly Review of Biology 27:139-68.

Cutler, H. C., and L. W. Blake

1976 Plants from archaeological sites east of the Rockies. Manuscript on file at American Archaeology Division, University of Missouri-Columbia.

Dodd, W. A., Jr.

1979 The wear and use of battered tools at Armijo Rockshelter. In _Lithic use-wear analysis,_ edited by B. Hayden. New York: Academic Press. Pp. 231-42.

Flint, T.

1828 _A condensed history and geography of the western United States or the Mississippi Valley_ (2 vols.). Cincinnati: Flint.

Ford, R. I.

1981 Gardening and farming before A.D. 1000: Patterns of prehistoric cultivation north of Mexico. _Journal of Ethnobiology_ 1:6-27.

1983 The evolution of corn revisited. _The Quarterly Review of Archaeology_ 4 (4):12-14.

Fowler, M. L.

1978 Cahokia and the American Bottom: Settlement archaeology. In _Mississippian settlement patterns,_ edited by B. D. Smith. New York: Academic Press. Pp. 455-78.

Fowler, M. L., and R. L. Hall

1972 Archaeological phases at Cahokia. _Illinois State Museum, Papers in Anthropology_ 1.

Fowler, M. L., and R. L. Hall

1975 Archaeological phases at Cahokia. In Perspectives in Cahokia archaeology, edited by J. A. Brown. Illinois Archaeological Survey Bulletin 10:1-14.

Franz, E. H., and T. A. Bazzaz

1977 Simulation of vegetation response to modified hyrologic regimes: A probabilistic model based on niche differentiation in a floodplain forest. Ecology 58:176-83.

Geis, J. W., and W. R. Boggess

1968 The Prairie Peninsula: Its origin and significance in the vegetational history of central Illinois. In The Quaternary of Illinois, edited by R. E. Bergstrom. University of Illinois, College of Agriculture, Special Bulletin No. 14, 89-95.

Green, T. J., and C. A. Munson

1978 Mississippian settlement patterns in southwestern Indiana. In Mississippian settlement patterns, edited by B. D. Smith. New York: Academic Press. Pp. 293-330.

Gregg, M. L.

1975 Settlement morphology and production specialization; the Horseshoe Lake site: A case study. Unpublished Ph.D. dissertation, Department of Anthropology, University of Wisconsin-Milwaukee.

Griffin, J. E.

1949 The Cahokia ceramic complexes. In Proceedings of the Fifth Plains Conference for archaeology, edited by J. L. Champe. University of Nebraska, Laboratory of Anthropology, Notebook 1:44-58.

Haas, D.

1978 An archaeological survey of the Little Femme Osage/River Hills area and the Loutre River valley: A multivariate approach to environment and site distributions in the lower Missouri Valley II locality. Report on file, American Archaeology Division, University of Missouri-Columbia.

Hall, J.

1836 Statistics of the West. Cincinnati: James.

Hayden, B.

1979 Snap, shatter, and superfractures: Use-wear of stone skin scrapers. In Lithic use-wear analysis, edited by B. Hayden. New York: Academic Press. Pp. 207-29.

Heilborn, B. L. (editor)

1967 The valley of the Mississippi illustrated, by Henry Lewis. St. Paul: Minnesota Historical Society.

Hosner, J. F., and L. S. Minckler

1963 Bottomland hardwood forests of southern Illinois: Regeneration and succession. Ecology 44:29-41.

Howell, D. L., and C. L. Kucera

1956 Composition of pre-settlement forests in three counties of Missouri. Torrey Botanical Club Bulletin 83:207-17.

Hus, H.

1908 An ecological cross section of the Mississippi River in the region of St. Louis, Missouri. Missouri Botanical Garden, Annual Report No. 19, 127-258.

Jackson, D. K., and T. E. Emerson

1983 Mississippian Sand Prairie Phase habitation component (Part II). In The Florence Street site, by T. E. Emerson, G. R. Milner, and D. K. Jackson. American Bottom Archaeology, FAI-270 Site Report No. 2:179-219.

Johannessen, S. J.

1982 Paleoethnobotanical trends in the American Bottom: Late Archaic through Mississippian. Paper presented at the 47th annual meeting of the Society for American Archaeology, Minneapolis, Minnesota.

1983 Paleoethnobotanical trends in the American Bottom. Unpublished Master's Thesis, Department of Anthropology, University of Missouri-Columbia.

1984 Paleoethnobotany. In American Bottom archaeology: A summary of the FAI-270 Project contribution to the culture of the Mississippi River valley,

edited by C. J. Bareis and J. W. Porter. Urbana: University of Illinois Press. Pp. 197-214.

Jones, A. S., and E. G. Patton

1966 Forest, prairie and soils in the Black Belt of Sumter County, Alabama, in 1832. Ecology 47:75-80.

Keeley, L. H.

1977 The functions of paleolithic flint tools. Scientific American 237:208-26.

1980 Experimental determination of tool uses. Chicago: University of Chicago Press.

Kelly, J. E., S. J. Ozuk, D. K. Jackson, P. L. McElrath, F. A. Finney, and D. Esarey

1984 Emergent Mississippian period. In American Bottom archaeology: A summary of the FAI-270 Project contribution to the culture history of the Mississippian River valley, edited by C. J. Bareis and J. W. Porter. Urbana: University of Illinois Press. Pp. 128-57.

Kelly, L. S.

1979 Animal resource exploitation by early Cahokia populations on the Merrel Tract. Illinois Archaeology Survey, Circular 4.

Kelly, L. S., and P. G. Cross

1984 Zooarchaeology. In American Bottom archaeology: A summary of the FAI-270 Project contribution to the culture history of the Mississippi River valley, edited by C. J. Bareis and

J. W. Porter. Urbana: University of Illinois Press. Pp. 215-32.

Keslin, R. O.

1964 Archaeological implications of the role of salt as an element of cultural diffusion. The Missouri Archaeologist 26.

King, J. E.

1973 Late Pleistocene palynology and biogeography of the western Missouri Ozarks. Ecological Monographs No. 12, 3-11.

1980 Post-Pleistocene vegetational changes in the midwestern United States. In Archaic Prehistory on the Prairie-Plain Border, edited by A. E. Johnson. University of Kansas, Publications in Anthropology No. 12, 3-11.

King, J. E., and W. H. Allen, Jr.

1977 A Holocene vegetation record from the Mississippi River valley, southeast Missouri. Quaternary Research 8:307-23.

Knudson, R.

1979 Discussion of fractures and angles: fracture patterning. In Lithic use-wear analysis, edited by B. Hayden. New York: Academic Press. Pp. 140-41.

Lee, R. B.

1968 What hunters do for a living, or, how to make out on scarce resources. In Man the hunter,

edited by R. B. Lee and I. DeVore. Chicago: Aldine. Pp. 30-48.

Leitner, S., and A. Jackson

1981 Presettlement forest of Illinois. _American Midland Naturalist_ 105:210-16.

Lewarch, D. E.

1982 Analysis of lithic artifacts. In _Cannon Reservoir Human Ecology Project: An archaeological study of cultural adaptations in the southern Prairie Peninsula,_ edited by M. J. O'Brien, R. E. Warren, and D. E. Lewarch. New York: Academic Press. Pp. 145-69.

Loomis, W. E., and A. L. McComb

1944 Recent advances of forest in Iowa. _Iowa Academy of Science, Proceedings_ No. 61, 217-24.

Lopinot, N.

1983 Plant macroremains and paleoethnobotanical implications. In Human adaptations in the Saline valley, Illinois (Vol. 2), edited by R. W. Jeffries, and B. M. Butler. _Southern Illinois University Center for Archaeological Investigations, Research Paper_ 33, 671-860.

Mangelsdorf, P. C.

1974 _Corn: Its origin and evolution._ Cambridge: Harvard University Press.

Martin, A. C., and W. D. Barkley

1961 _Seed identification manual._ Berkeley: University

of California Press.

Milner, G. R.

1984 The Julien site. <u>American Bottom Archaeology FAI-270 Site Report,</u> 7.

Milner, G. R., T. E. Emerson, M. W. Mehrer, J. A. Williams, and D. Esarey

1984 Mississippian and Oneota period. In <u>American Bottom Archaeology: A summary of the FAI-270 Project contribution to the culture history of the Mississippi River valley,</u> edited by C. J. Bareis and J. W. Porter. Urbana: University of Illinois Press. Pp. 156-86.

Morse, D. F., and P. A. Morse

1983 <u>Archaeology of the Central Mississippi Valley.</u> New York: Academic Press.

Muller, J.

1978 The Kincaid site: Mississippian settlement in the environs of a large site. In <u>Mississippian settlement patterns,</u> edited by B. D. Smith. New York: Academic Press. Pp. 269-92.

Newcomer, M. H., and L. H. Keeley

1979 Testing a method of microwear analysis with experimental flint tools. In <u>Lithic use-wear analysis</u>, edited by B. Hayden. New York: Academic Press. Pp. 195-205.

No author

1824 <u>The navigator: Containing directions for navigating</u>

the Ohio and Mississippi rivers. Pittsburgh: Cramer and Spear.

O'Brien, M. J.

1981 Internal variation in a Mississippian site: The Ste. Genevieve project. Paper presented at the 47th annual meeting of the Society for American Archaeology. San Diego, May 1981.

O'Brien, M. J., J. L. Beets, R. E. Warren, T. Hotrabhuavanandas, T. W. Barney, and E. E. Voigt

1982 Digital enhancement and grey-level slicing of aerial photographs: Techniques for archaeological analysis of intrasite variability. *World Archaeology* 14:173-90.

Odell, G. H.

1979 A new and improved system for the retrieval of functional information from microscopic observations of chipped stone tools. In *Lithic use-wear analysis,* edited by B. Hayden. New York: Academic Press. Pp. 329-44.

1981 The mechanics of use-breakage of stone tools: Some testable hypotheses. *Journal of Field Archaeology* 8:197-209.

Odell, G. H., and F. Odell-Vereecken

1980 Verifying the reliability of lithic use-wear assessments by "blind tests": The low power approach. *Journal of Field Archaeology* 7:87-120.

Panshin, A. J., and C. de Zeeuw

1970 *Textbook of wood technology* (3rd ed.). New York: McGraw-Hill.

Phillips, P., J. A. Ford, and J. B. Griffin

1951 Archaeological survey in the lower Mississippi alluvial valley, 1940-1947. *Harvard University, Papers of the Peabody Museum of Archaeology and Ethnology* 25.

Pittman, P.

1770 *The present state of the European settlement on the Mississippi: With a geographic description of that river, illustrated by plans and draughts.* Cleveland: Clark.

Prentice, G.

1983 Cottage industries: Concepts and implications. *Midcontinental Journal of Archaeology* 8:17-48.

Prentice, G., and M. Mehrer

1981 The Lab Woofie site (11-S-346): An unplowed Mississippian site in the American Bottom region of Illinois. *Midcontinental Journal of Archaeology* 6:33-53.

Reagan, M. J.

1977 A reevaluation of the descriptive and terminological treatment of the Wickliffe form. In Investigation and comparison of two fortified Mississippi tradition archaeological sites in southeastern Missouri: A preliminary compilation, edited

by C. H. Chapman. _The Missouri Archaeologist_ 38:291-307.

Reeder, R. L., E. E. Voigt, and M. J. O'Brien

1983 Investigations in the lower Perche-Hinkson drainage. _University of Missouri, American Archaeology Division, Publications in Archaeology_ No. 1.

Robertson, P. A., G. T. Weaver, and J. A. Cavanaugh

1978 Vegetation and tree species patterns near the northern terminus of the Southern Floodplain Forest. _Ecological Monographs_ 48:249-67.

Rochow, J. J.

1969 Gradient analysis in Mid-Missouri's forests. Unpublished Master's Thesis, Department of Forestry, University of Missouri-Columbia.

Semenov, S. A.

1964 _Prehistoric Technology._ New York: Barnes and Noble Press.

Shelford, V. E.

1954 Some lower Mississippi Valley flood plain biotic communities: Their age and elevation. _Ecology_ 35:126-42.

Smith, B. D.

1978 _Prehistoric patterns of human behavior: A case study in the Mississippi valley._ New York: Academic Press.

Soil Conservation Service

n.d. Unpublished soil map of the Ste. Genevieve locality. U.S. Department of Agriculture.

Soil Survey Staff

1975 Soil Taxonomy: A basic system of soil classification for making and interpreting soil surveys. _U.S. Department of Agriculture, Soil Conservation Service, Agricultural Handbook_ No. 436.

Sorenson, C. J., J. C. Knox, J. A. Larson, and R. A. Bryson

1971 Paleosols and the forest border in Keewatin, N. W. T. _Quaternary Research_ 1:468-73.

Spielbauer, R. H.

1984 Potentialities for trace element analysis in southern Illinois cherts. In Prehistoric chert exploitation: Studies from the Midcontinent, edited by B. M. Butler and E. E. May. _SIU-Carbondale, Center for Archaeological Investigations, Occasional Paper_ No. 2, 271-86.

Steyermark, J. A.

1963 _Flora of Missouri._ Ames: Iowa State University Press.

Stoddard, A.

1812 _Sketches, historical and descriptive, of Louisiana._ Philadelphia: Carey.

Styles, B. W.

1981 Faunal exploitation and resource selection: Early Late Woodland subsistence in the lower

Illinois valley. Northwestern University Archaeological Program, Scientific Papers No. 3.

Swain, A. M.

1978 Environmental change during the past 2000 years in north-central Wisconsin: Analysis of pollen, charcoal, and seeds from varved lake sediments. Quaternary Research 10:55-68.

Tringham, R., G. Cooper, G. Odell, B. Voytek, and A. Whitman

1974 Experimentation in the formation of edge damage: A new approach to lithic analysis. Journal of Field Archaeology 1:171-96.

Vogel, J. O.

1975 Trends in Cahokia ceramics: Preliminary study of the collections from Tracts 15A and 15B. In Perspectives in Cahokia archaeology. Illinois Archaeological Survey, Bulletin 10:32-125.

Voigt, E.E.

1982 Late Woodland subsistence at 23MNS12: Prehistoric environment and agriculture in the Ozark Highland. In The Feeler site, 23MNS12: A multicomponent site in the central Gasconade drainage (Appendix III), edited by R. L. Reeder. Report submitted to Missouri State Highway and Transportation Department.

1983 Analysis of paleoethnobotanical remains (Appendix I). In Investigations in the lower Perche-Hinkson

drainage, by R. L. Reeder, E. E. Voigt, and M. J. O'Brien. University of Missouri-Columbia, American Archaeology Division, Publications Archaeology No. 1:235-48.

1984 Environmental setting. In Archaeological testing of the Route 60, Butler County Project: Sites 23BU230, 23BU231, 23BU232, 23BU239, 23BU241, 23BU252, by T. D. Holland. Report submitted to Missouri Highway and Transportation Commission. Pp. 6-40.

Voigt, E. E., and M. J. O'Brien

1982 The use and misuse of soils-related data in mapping and modeling past environments: An example from the central Mississippi River valley. Contract Abstracts and CRM Archeology 2:22-35.

Warren, R. E.

1976 Site survey and survey design. In Cannon Reservoir Archaeological Project report (Appendix II), edited by D. R. Henning. University of Nebraska, Department of Anthropology, Technical Report No. 76-03, 1-333.

Warren, R. E., and M. J. O'Brien

1981 Regional sample stratification: The drainage class technique. Plains Anthropologist 26:213-28.

Wendland, W. M.

1978 Holocene man in North America: The ecological

setting and climatic background. Plains Anthropologist 23:273-87.

Wendland, W. M., and R. A. Bryson

1974 Dating climatic episodes of the Holocene. Quaternary Research 4:9-24.

Whittaker, R. H.

1975 Communities and ecosystems (2nd ed.). New York: Macmillan.

Williams, S.

1954 An archaeological study of the Mississippi culture in southeast Missouri. Ph.D. dissertation, Yale University.

Wood, W. R.

1976 Vegetation reconstruction and climatic episodes. American Antiquity. 41:206-7.

Wuenscher, J. E., and A. J. Valiunas

1967 Presettlement forest composition of the River Hills region of Missouri. American Midland Naturalist 78:487-95.

Yarnell, R. A.

1983 Prehistoric plant foods and husbandry in eastern North America. Paper presented at the 48th annual meeting of the Society for American Archaeology.

Yellen, J. E.

1977 Cultural patterning in faunal remains: Evidence from the !Kung Bushmen. In Experimental Archeology, edited by D. Ingersoll, J. E. Yellen, and

W. MacDonald. New York: Columbia University Press. Pp. 271-331.

PLATES

Plate I

Ceramic types recovered from 23STG158:
(a) Mississippi Plain; (b) Fabric Impressed;
(c) Cahokia Cordmarked; (d) Powell Plain;
(e) Wells Incised; and (f) Ramey Incised.

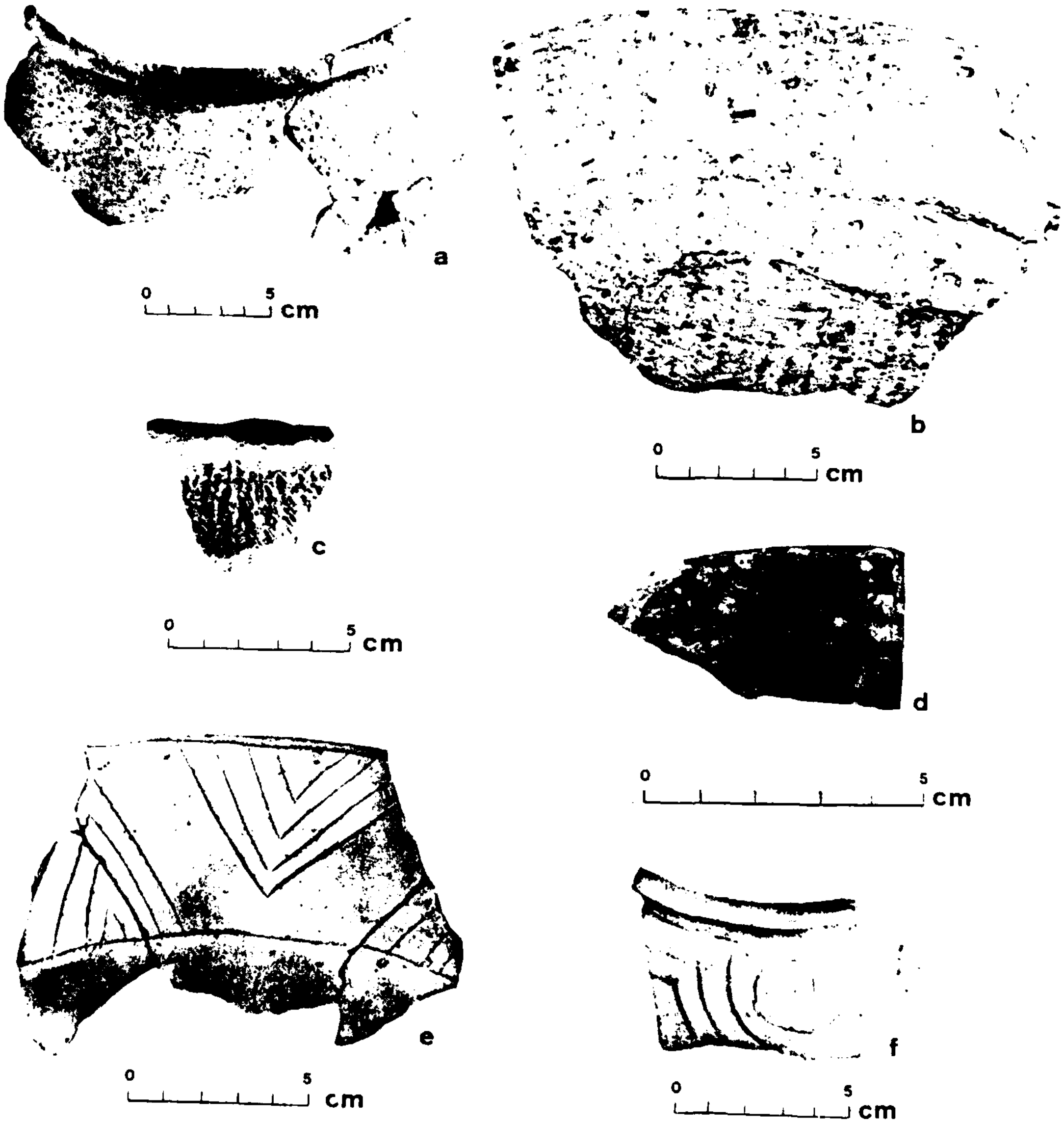

a
0 5 cm
b
0 5 cm
c
0 5 cm
d
0 5 cm
e
0 5 cm
f
0 5 cm

Plate II

Ceramic types recovered from 23STG158:
(a) Punctate; (b) Wickliffe Incised;
and (c) Red and White.

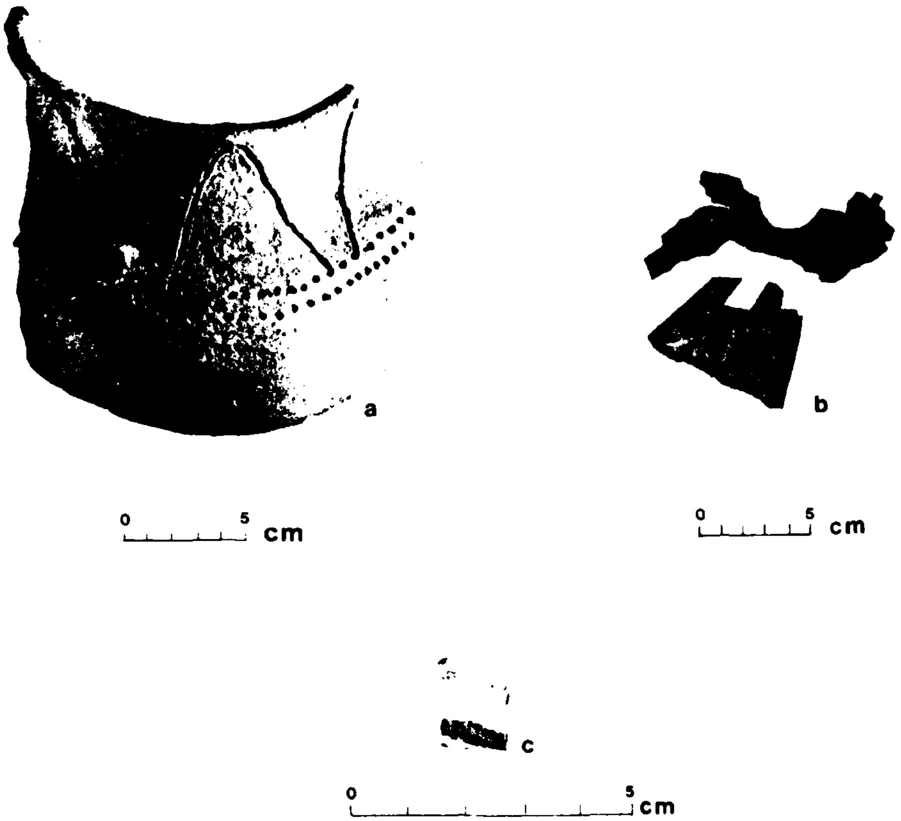

a
b
c
0 5 cm
0 5 cm
0 5 cm

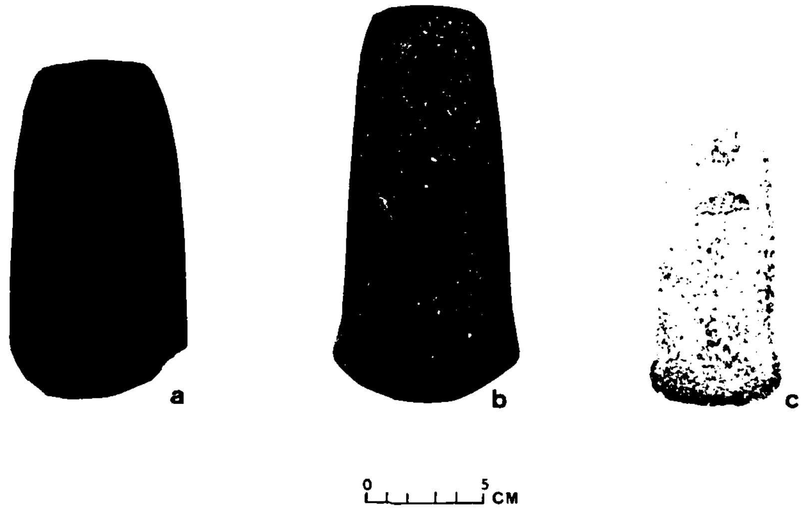
Plate III

Chipped-stone tools in the St. Louis District surface collection: (a) hoe; and (b) biface fragment.


a
b
0
5cm

Plate IV

Basalt tools and galena cache in the St. Louis District surface collection: (a-c) adzes; and (d) galena.


a
b
c
0
5
CM

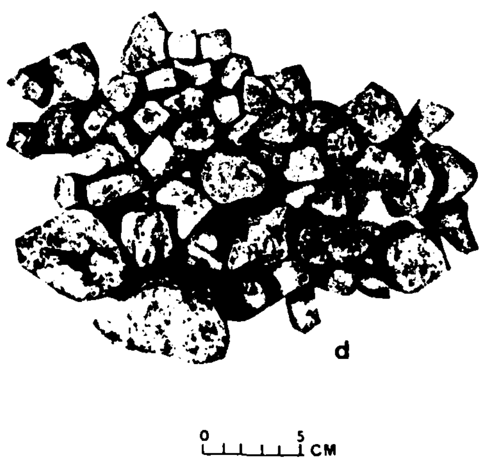

d
0
5
CM

Plate V

Chipped-stone tools in the Kapps surface collection from 23STG158: (a) hammerstone; (b) hoe fragment; (c) adze; and (d) hoe fragment.

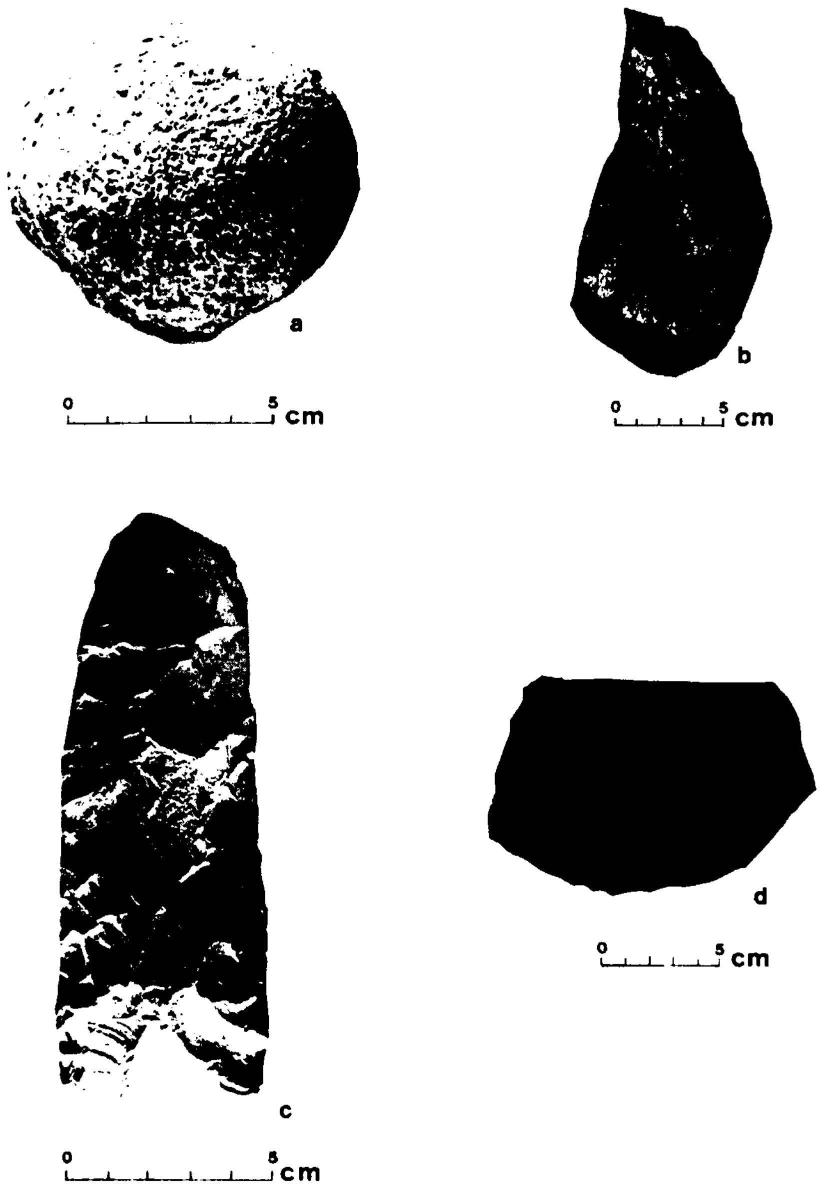
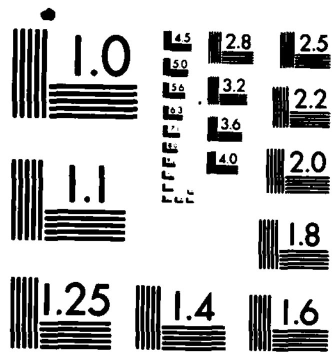

a
0 5 cm
b
0 5 cm
c
0 5 cm
d
0 5 cm

Plate VI

Limestone hoes (a-b) and basalt tools (c-d) in the Kapps collection from 23STG158.

AD-A162 166 ARCHAEOLOGICAL TESTING OF THE BAUMAN SITE (23STG158) 3/3
STE GENEVIEVE COUNTY MISSOURI(U) MISSOURI UNIV-COLUMBIA
AMERICAN ARCHAEOLOGY DIV E E VOIGT ET AL MAY 85 23
UNCLASSIFIED DACW43-83-M-3837 F/G 5/6 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

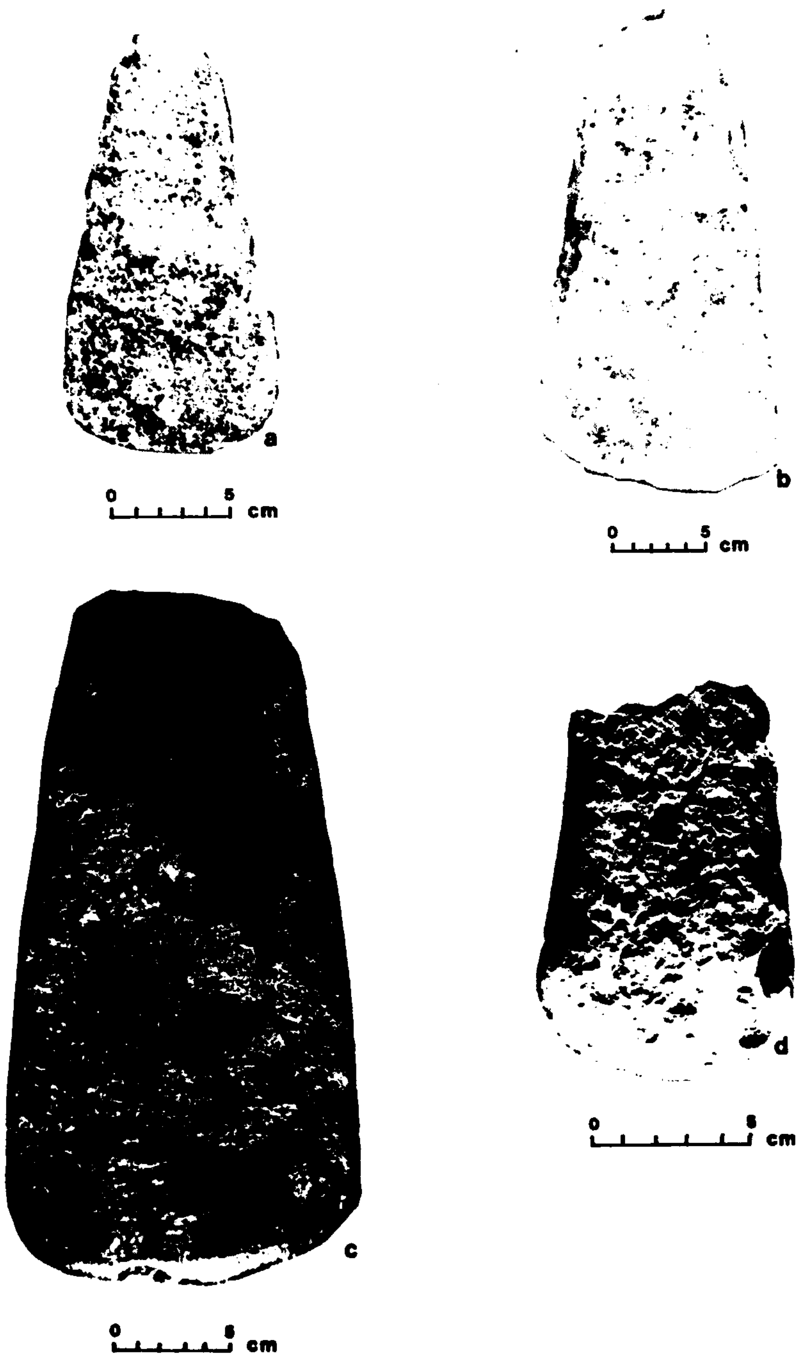

a
0 5 cm
b
0 5 cm
c
0 5 cm
d
0 5 cm

Plate VII

Basalt blanks (a-d) in the Kapps surface collection from 23STG158.

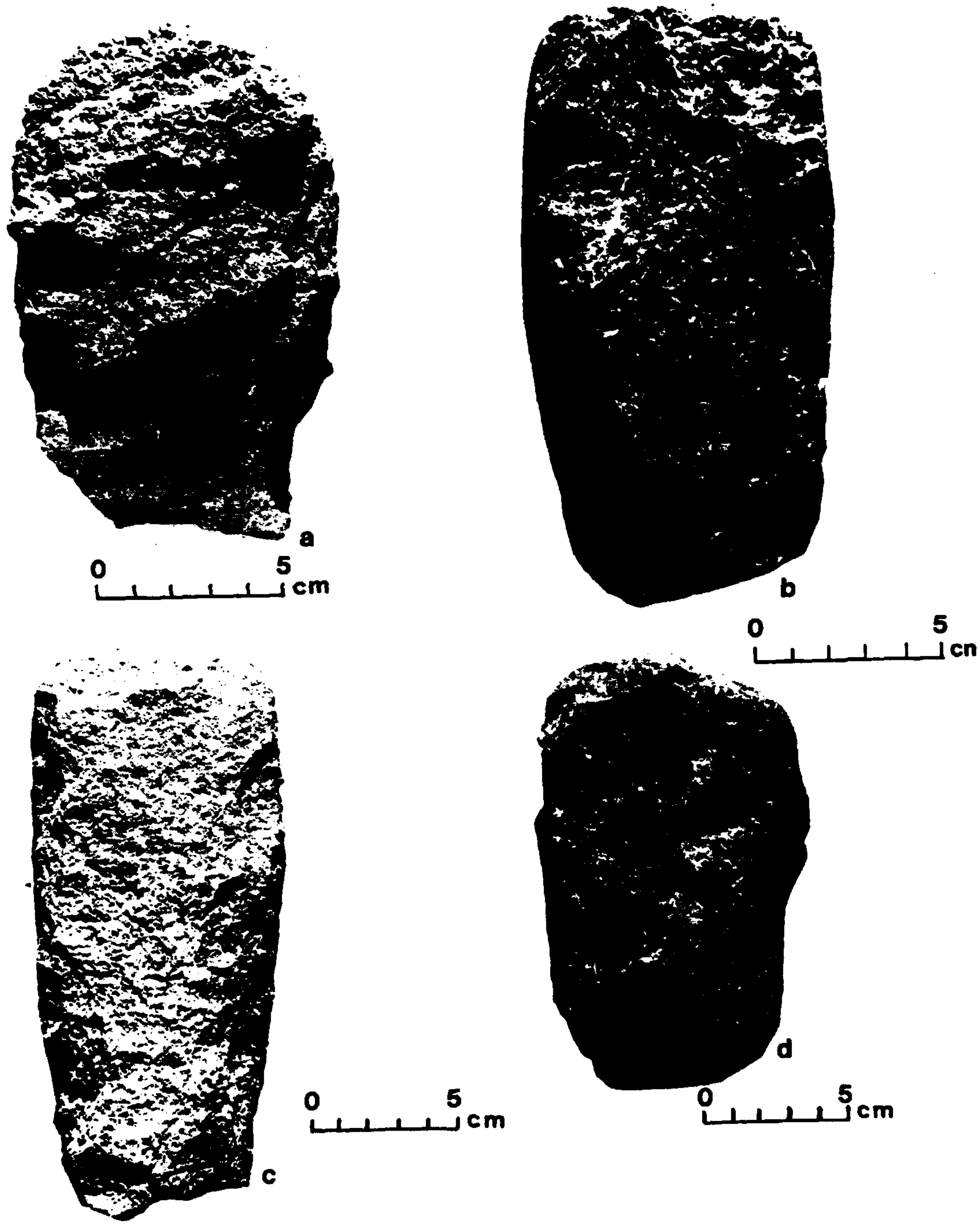

a
0 5 cm
b
0 5 cn
c
0 5 cm
d
0 5 cm

Plate VIII

Artifacts in the UMC surface collection: (a-d) handles from Mississippian Plain vessels; (e-g) Powell Plain bodysherds; (h-l) Cahokia Cordmarked bodysherds; (m-n) projectile points; and (o-v) groundstone and sandstone tools.

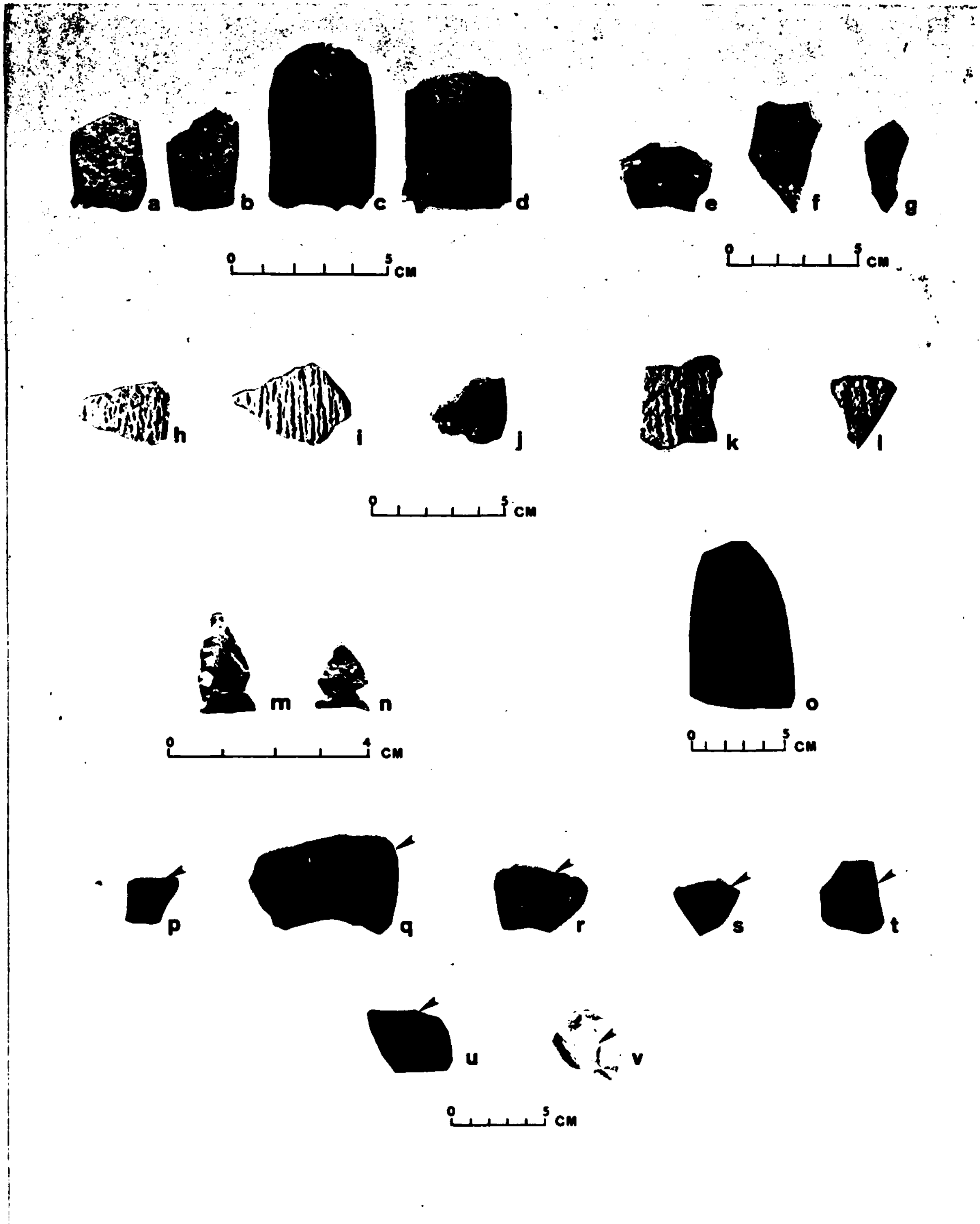
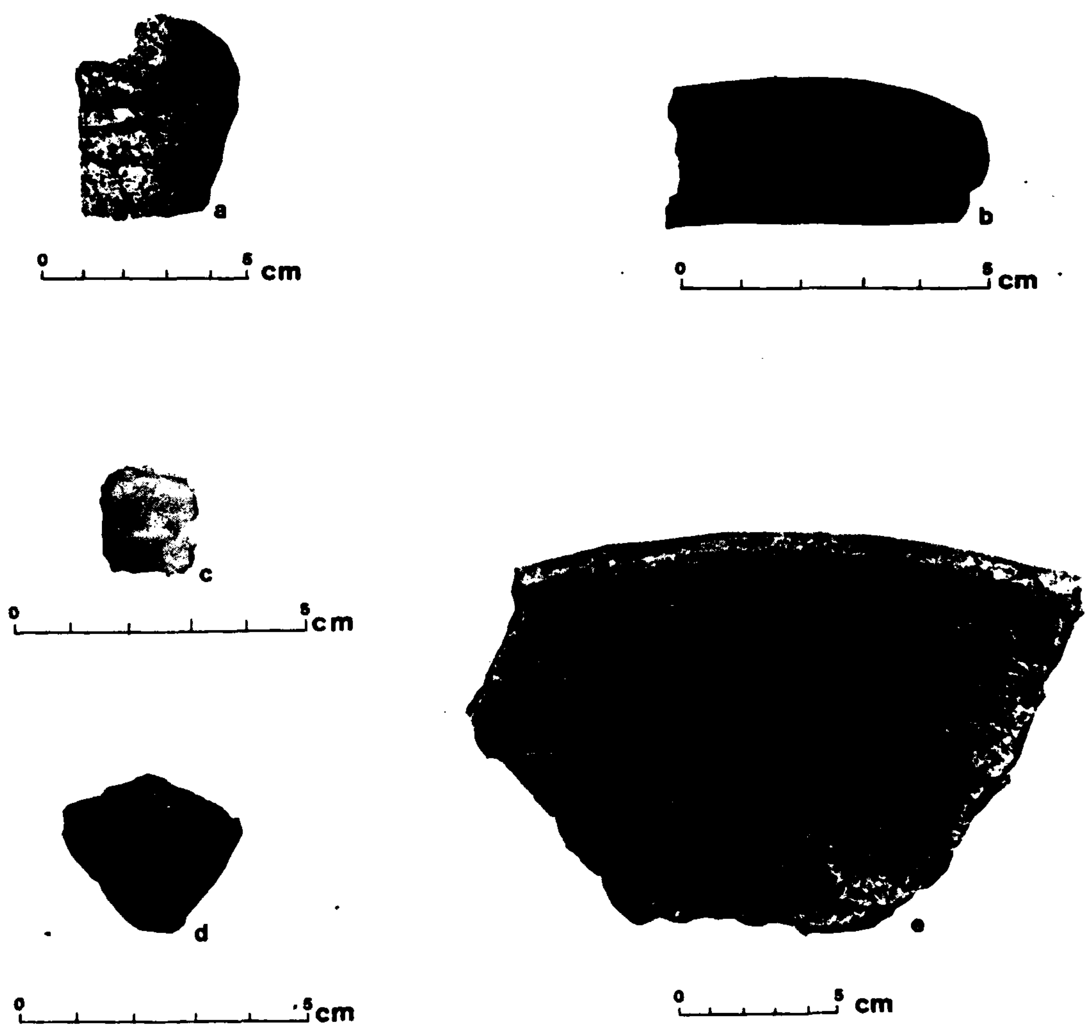

a
b
c
d
e
f
g
0 5 CM
0 5 CM
h
i
j
k
l
0 5 CM
m
n
o
0 4 CM
0 5 CM
p
q
r
s
t
u
v
0 5 CM

Plate IX

Artifacts recovered from Profiles A and B: (a) incised plate rim; (b) Mississippi Red-Filmed clay object; (c) historical French gun flint; (d) Wells Incised rimsherd fragment; and (e) Fabric Impressed rimsherd fragment.


a
0 5 cm
b
0 5 cm
c
0 5 cm
d
0 5 cm
e
0 5 cm

END

FILMED

1-86

DTIC